



National University of Engineering (UNI)
School of Civil Engineering
Syllabus 2027-I

1. COURSE

CB1E1. Technical Drawing & CAD (Mandatory)

2. GENERAL INFORMATION

2.1 Course	: CB1E1. Technical Drawing & CAD
2.2 Semester	: 2 nd Semester.
2.3 Credits	: 3
2.4 Hours	: 4 HT; 2 HP;
2.5 Duration of the period	: 16 weeks
2.6 Type of course	: Mandatory
2.7 Learning modality	: Face to face
2.8 Prerequisites	: None

3. PROFESSORS

Meetings after coordination with the professor

4. INTRODUCTION TO THE COURSE

Technical Drawing and CAD is a foundational course for engineering students, as it provides the graphical language needed to communicate technical projects. Mastery of descriptive geometry, drafting standards, and Computer-Aided Design (CAD) tools allows students to represent three-dimensional objects with technical precision on a two-dimensional plane, an essential skill for the design, execution, and supervision of engineering projects. The course closes with an application to civil engineering drawings, covering the symbols and conventions used in foundation and basic structural plans.

5. GOALS

- Apply national and international technical drawing standards to produce engineering drawings.
- Develop spatial visualization skills through the study of projections and descriptive geometry.
- Use modern CAD software tools to create geometric models and technical project documentation.
- Apply engineering drawing conventions to civil engineering plans, including foundations and basic structures.

6. COMPETENCES

ABET-1) An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics. (Usage)

ABET-2) An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors. (Usage)

7. TOPICS

Unit 1: Fundamentals of Technical Drawing and Instrumentation (8 hours)	
Competences Expected: ABET-1,ABET-2	
Topics	Learning Outcomes
- History and importance of technical drawing in engineering - Drawing instruments and graphical scales - Paper formats, title blocks, and line types per technical standards - Basic geometric constructions	- Correctly use technical drawing instruments in accordance with drafting standards [Familiarity] - Apply appropriate scales to represent physical elements in drawings [Usage]
Readings : [Luzadder1993], [Jensen2007]	

Unit 2: Descriptive Geometry and Projections (12 hours)	
Competences Expected: ABET-1,ABET-2	
Topics	Learning Outcomes
- Orthographic projection system: first-angle and third-angle projection - Projection of points, lines, and planes - Principal views and auxiliary views - Isometric and oblique (cavalier) perspectives	- Develop the ability to represent 3D objects in 2D orthographic projections [Usage] - Interpret auxiliary views to determine true lengths and slopes [Assessment]
Readings : [Luzadder1993]	

Unit 3: Computer-Aided Design (CAD) 2D (16 hours)	
Competences Expected: ABET-1,ABET-2	
Topics	Learning Outcomes
- User interface and drawing environment configuration - Commands for creating and editing geometric entities - Layer, block, and attribute management - Technical dimensioning and generation of print files (layouts)	- Fluently handle CAD software commands to create complex geometry [Usage] - Organize graphical information through efficient use of layers and external references [Usage]
Readings : [Omura2021]	

Unit 4: Introduction to 3D Modeling and Engineering Drawings (12 hours)	
Competences Expected: ABET-1,ABET-2	
Topics	Learning Outcomes
- Basic solid and surface modeling - Automatic generation of views and sections from 3D models - Technical symbols and drawings applied to civil engineering: foundations and basic structures	- Create basic three-dimensional models using solid modeling tools [Familiarity] - Produce engineering drawings that meet professional presentation standards [Assessment] - Apply technical symbols and produce foundation and basic structural drawings for civil engineering [Usage]
Readings : [Omura2021], [Jensen2007]	

8. WORKPLAN

8.1 Methodology

Individual and team participation is encouraged to present their ideas, motivating them with additional points in the different stages of the course evaluation.

8.2 Theory Sessions

The theory sessions are held in master classes with activities including active learning and roleplay to allow students to internalize the concepts.

8.3 Practical Sessions

The practical sessions are held in class where a series of exercises and/or practical concepts are developed through problem solving, problem solving, specific exercises and/or in application contexts.

9. EVALUATION SYSTEM

***** EVALUATION MISSING *****

10. BASIC BIBLIOGRAPHY