

Construction Methods and Estimation I

This course aims to introduce students to construction project execution methods and contract systems, with a focus on construction equipment in terms of types, ownership and operating costs, productivity, and the factors affecting performance, in addition to topics related to soil improvement, compaction, and the associated engineering fundamentals.

Educational Institution: College of Engineering / University of Warith Al-Anbiyaa

Department / Centre: Department of Civil Engineering

Course Title / Code: Construction Methods and Estimation I

Program(s) in which it is offered: BSc in Civil Engineering

Available Attendance Forms: Full-time regular students

Semester / Year: First Semester

Total Study Hours: 24 theoretical hours + 12 practical hours

Date of Preparing this Description: 10-10-2025

Course Objectives

1. To introduce students to the fundamentals of construction methods and estimation.
2. To introduce students to execution methods and contract systems adopted in the construction industry.
3. To introduce students to the main factors affecting the selection of construction equipment.
4. To introduce students to methods of calculating the ownership and operating costs of construction equipment.
5. To introduce students to the engineering fundamentals of construction equipment.
6. To introduce students to the methods and techniques used to improve the physical properties of soil.
7. To introduce students to the types of construction machinery used in construction projects.
8. To introduce students to methods of estimating the productivity of construction machinery.

Course Learning Outcomes, Teaching, Learning, and Assessment Methods

A. Cognitive Objectives

1. Knowledge of construction contract execution methods adopted in the construction industry.
2. Knowledge of the types of construction machinery, and methods for calculating their costs, productivity, and the factors affecting them.
3. Knowledge of soil properties and methods of treatment and improvement.

B. Affective and Value-Based Objectives

1. Enhancing engineering ability and intuition.
2. Developing accuracy of observation and depth of thinking.
3. Developing speed in reading drawings and identifying the information required for use.
4. Developing speed and accuracy in decision-making.

C. Teaching and Learning Methods

1. Delivering lectures.
2. Reading textbooks and references, and consulting selected websites (self-learning).
3. Classroom discussion to deliver the scientific material to students.
4. Promoting self-learning through deriving solutions to the problems presented.
5. Assigning extracurricular homework and solving in-class examples.

D. Assessment Methods

1. Quizzes and classroom participation.
2. Assessment through reports submitted after each field application.
3. Evaluation of students through their participation in discussions.
4. Tests based on a variety of examples.
5. Practical tests on site.

6. Monthly and final examinations.

E. Teaching and Learning Methods for Developing Intellectual Skills

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| 1. Asking questions and raising inquiries characterized by depth and accuracy. |
| 2. Guiding students toward understanding causes and reasons. |
| 3. Brainstorming. |
| 4. Explaining the material thoroughly with the solution of various examples, while involving and following up students in solving examples. |

F. General and Transferable Skills

Developing and enhancing the student's ability to:

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| 1. Use bills of quantities. |
| 2. Use computer software. |
| 3. Deal with constructional and architectural drawings and plans. |
| 4. Use modern technologies related to the course contents. |
| 5. Face problems and challenges and find appropriate solutions. |
| 6. Translate academic information into practical application. |

G. Thinking Skills

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| 1. Stimulating students' curiosity about the equipment used, its benefits, and its importance for proper project execution. |
| 2. Developing the ability to relate information obtained through fieldwork to the work environment. |
| 3. Understanding the direct impact of quantity calculation on architectural design through recognizing the importance of accuracy in quantity and cost calculation. |

Course Structure

Week	Hours	Unit / Topic Name	Required Learning Outcomes	Teaching Method
First	3	Procurement Approaches for Construction Projects	Identifying execution methods and contract systems adopted in the construction industry	Theoretical
Second	3	Construction Equipment	Identifying construction machinery	Theoretical
Third and Fourth	6	Cost of Equipment	Learning how to calculate ownership and operating costs of construction equipment	Theoretical
Fifth and Sixth	6	Engineering Fundamentals for Construction Equipment	Identifying the engineering fundamentals affecting construction equipment	Theoretical
Seventh	3	Factors Affecting Equipment Performance	Identifying the factors affecting the performance of construction equipment	Theoretical
Eighth	3	Gradeability	Learning how to calculate the gradeability of construction equipment on slopes	Theoretical
Ninth	3	Soil Stabilization	Identifying methods of improving and treating soil stability	Theoretical
Tenth	3	Soil Compaction	Identifying methods of soil compaction and the construction equipment used for this purpose	Theoretical
Eleventh to Thirteenth	9	Productivity of Construction Equipment	Teaching students how to estimate the productivity of construction equipment	Theoretical
Fourteenth and Fifteenth	6	Excavation Equipment	Identifying the types of construction equipment used in excavation works	Theoretical

Assessment Methods Adopted in the Course Structure

1. Monthly examinations.
2. Final examinations.
3. Quick tests.