**Ministry of Higher Education and Scientific Research**
**Scientific Supervision and Scientific Evaluation Apparatus**
**Directorate of Quality Assurance and Academic Accreditation**
**Accreditation Department**

# Academic Program and Course Description Guide

**2025**

# Introduction:

The educational program is a well-planned set of courses that include procedures and experiences arranged in the form of an academic syllabus. Its main goal is to improve and build graduates' skills so they are ready for the job market. The program is reviewed and evaluated every year through internal or external audit procedures and programs like the External Examiner Program.

The academic program description is a short summary of the main features of the program and its courses. It shows what skills students are working to develop based on the program's goals. This description is very important because it is the main part of getting the program accredited, and it is written by the teaching staff together under the supervision of scientific committees in the scientific departments.

This guide, in its second version, includes a description of the academic program after updating the subjects and paragraphs of the previous guide in light of the updates and developments of the educational system in Iraq, which included the description of the academic program in its traditional form (annual, quarterly), as well as the adoption of the academic program description circulated according to the letter of the Department of Studies T 3/2906 on 3/5/2023 regarding the programs that adopt the Bologna Process as the basis for their work.

In this regard, we can only emphasize the importance of writing an academic programs and course description to ensure the proper functioning of the educational process.

## Concepts and terminology:

**Academic Program Description:** The academic program description provides a brief summary of its vision, mission and objectives, including an accurate description of the targeted learning outcomes according to specific learning strategies.

**Course Description:** Provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the students to achieve, proving whether they have made the most of the available learning opportunities. It is derived from the program description.

**Program Vision:** An ambitious picture for the future of the academic program to be sophisticated, inspiring, stimulating, realistic and applicable.

**Program Mission:** Briefly outlines the objectives and activities necessary to achieve them and defines the program's development paths and directions.

**Program Objectives:** They are statements that describe what the academic program intends to achieve within a specific period of time and are measurable and observable.

**Curriculum Structure:** All courses / subjects included in the academic program according to the approved learning system (quarterly, annual, Bologna Process) whether it is a requirement (ministry, university, college and scientific department) with the number of credit hours.

**Learning Outcomes:** A compatible set of knowledge, skills and values acquired by students after the successful completion of the academic program and must determine the learning outcomes of each course in a way that achieves the objectives of the program.

**Teaching and learning strategies:** They are the strategies used by the faculty members to develop students' teaching and learning, and they are plans that are followed to reach the learning goals. They describe all classroom and extra-curricular activities to achieve the learning outcomes of the program.

# Academic Program Description Form

**University Name**: **Northern Technical University**

**Faculty/Institute**: **Technical Institute / Mosul**

**Scientific Department**: **Department of Civil Technologies**

**Academic or Professional Program Name**: **Technical diploma**

**Final Certificate Name**: **Diploma in civil technology**

**Academic System**: **Courses**

**Description Preparation Date**: **1/9/2024**

**File Completion Date**: **8/7/2025**

**Signature:**

**Head of Department Name:**

Asst. Proof. Mohammed .H. Yaseen

**Date:** 29/7/2025

**Signature:**

**Scientific Associate Name:**

Dr. Hassan M. Qassim

**Date:** 30/7/2025

**The file is checked by:**

**Department of Quality Assurance and University Performance**

**Director of the Quality Assurance and University Performance Department:**

**Date:** 7/2025

**Signature:**

**Approval of the Dean**

## 1. Program Vision

Building a technical education system with an academic, applied and practical framework that takes into account scientific progress in the field of construction and building, relying on a comprehensive quality system and performance development, based on meeting the needs of the labor market (government and private sectors) in order to raise the construction and building branch to the level of specialized international scientific institutions.

## 2. Program Mission

To bring the construction and building specialization in technical education to the highest quality by keeping pace with global developments, responding to the evolution of curricula, and providing graduates with skills and experience that meet the needs of the labor market by adopting the targeted quality of the technical education process.

## 3. Program Objectives

It aims to prepare qualified technical personnel to carry out various civil works, conduct laboratory and field tests, implement maps and surveys, and calculate quantities and dimensions of civil works projects.

## 4. Program Accreditation

nothing

## 5. Other external influences

nothing

## 6. Program Structure

| Program Structure | Number of Courses | Credit hours | Percentage | Reviews* |
|---|---|---|---|---|
| Institution Requirements | 10 | 20 | 12% | |
| In Requirements | 3 | 7 | 4% | |
| Department Requirements | 43 | 169 | 84% | |
| Summer Training | | | | |
| Other | | | | |

* This can include notes whether the course is basic or optional.

## 7. Program Description

| Year/Level | Course Code | Course Name | Credit Hours | |
|---|---|---|---|---|
| | | | theoretical | practical |
| First Year/ Building and Construction Branch | NTU100 | Human Rights and democracy | 2 | |
| | NTU101 | English language | 2 | |
| | NTU102 | computer | 1 | 1 |
| | NTU103 | Arabic language | 2 | |
| | NTU104 | Sports | 1 | 1 |
| | TIMO110 | Mathematics 1 | 2 | |
| | TIMO111 | Mechanical workshops | | 3 |
| | TIMO112 | Mathematics 2 | 2 | |
| | CITB120 | Construction materials | 2 | 2 |
| | CITB121 | Surveying | 2 | 4 |
| | CITB122 | Engineering drawing 1 | | 3 |
| | CITB123 | Engineering drawing 2 | | 3 |
| | CITB124 | Summer Training | | |
| | CITB125 | Engineering mechanics | 4 | 2 |
| | CITB126 | Building materials and asphalt | 2 | 2 |
| | CITB127 | Building and fabricated building | 2 | |
| | NTU200 | English language | 2 | |
| | NTU201 | Computer | 1 | 1 |

| | | | | |
|---|---|---|---|---|
| Second Year/ Building and Construction Branch | NTU202 | Arabic language | 2 | |
| | NTU203 | Arab bath crime in Iraq | 2 | |
| | NTU204 | Professional ethics | 2 | |
| | CITB221 | Concrete technology 1 | 2 | 2 |
| | CITB222 | Soil mechanics 1 | 2 | 2 |
| | CITB223 | Advanced surveying | 2 | 3 |
| | CITB224 | Concrete technology 2 | 2 | 2 |
| | CITB225 | Soil mechanics 2 | 2 | 2 |
| | CITB226 | Project 1 | | 2 |
| | CITB227 | Project 2 | | 2 |
| | CITB228 | Computer application | 2 | 4 |
| | CITB229 | Quantity surveying | 2 | 4 |
| | CITB230 | Civil Drawing | 2 | 4 |
| | CITB231 | Structural drawing | 2 | 4 |
| | CITB232 | Construction technology | | 3 |
| | CITB233 | Construction machine | 2 | |
| First Year/ Computer drawing branch | NTU100 | Human Rights and democracy | 2 | |
| | NTU101 | English language | 2 | |
| | NTU102 | Computer | 1 | 1 |
| | NTU103 | Arabic language | 2 | |
| | NTU104 | Sports | 1 | 1 |
| | TIMO110 | Mathematics 1 | 2 | |
| | TIMO111 | Mechanical Workshop | | 3 |
| | TIMO112 | Mathematics 2 | 2 | |
| | CITC120 | Construction Materials | 2 | 2 |
| | CITC121 | Surveying | 2 | 4 |
| | CITC122 | Engineering Drawing 1 | | 3 |
| | CITC123 | Engineering Drawing 2 | | 3 |
| | CITC124 | Summer Training | | |
| | CITC125 | Engineering Mechanics | 4 | 2 |
| | CITC126 | Mechanical Drawing | 1 | 2 |
| | CITC127 | Electrical Drawing | 1 | 2 |
| | CITC128 | Descriptive geometry | 0 | 5 |
| | NTU200 | English language | 2 | |
| | NTU201 | Computer | 1 | 1 |
| | NTU202 | Arabic Language | 2 | |

| | | | | |
|---|---|---|---|---|
| Second Year/ Computer drawing branch | **NTU203** | **Arab bath crime in Iraq** | **2** | |
| | **NTU204** | **Professional Ethics** | **2** | |
| | **CITC221** | **Principles of Architectural Drawing** | **2** | **5** |
| | **CITC222** | **Principles of Structural Drawing** | **2** | **4** |
| | **CITC223** | **Advanced Architectural Drawing** | **2** | **4** |
| | **CITC224** | **Advanced Structural Drawing** | **2** | **4** |
| | **CITC225** | **Advanced Presentation** | **2** | **4** |
| | **CITC226** | **Project 1** | | **2** |
| | **CITC227** | **Project 2** | | **2** |
| | **CITC228** | **Computer Application** | **2** | **4** |
| | **CITC229** | **Quantity Surveying** | **2** | **4** |
| | **CITC230** | **Irrigation and Highway Drawing** | **2** | **2** |
| | **CITC231** | **Sanitary drawing** | **1** | **2** |

## 8. Expected learning outcomes of the program

**Knowledge**

A1: Specialized Technical Knowledge: Demonstrate a comprehensive understanding of construction technology, relevant to building and construction techniques.

A2: Construction Materials and Technologies

Identify traditional and advanced building materials and evaluate their properties.

A3: Technical Standards and Regulations

Understand and apply national and international regulations, codes, and standards in the design and implementation of construction projects.

A4: Construction Technology and Innovation

Familiarity with modern construction technologies such as prefabrication, smart materials, and technical digital tools.

**Skills**

B1: Site Investigation, Surveying, and Inspection
Conduct laboratory and field tests on materials and soils and analyze the results
B2: Structural Drawings and Analysis:
Prepare and interpret structural and architectural drawings using computers
B3: Project Planning and Management:
Apply scheduling and resource management techniques to efficiently implement projects
B4: Teamwork: Communicate effectively within multiple teams.

**Ethics**

c1: Professional Ethics: Practicing the profession with integrity, adhering to ethical standards, and serving the community.
c2: Environmental Responsibility: Integrating sustainability principles and sound environmental practices into the planning, design, and implementation phases of projects.
cA3: Continuous Learning: Committing to personal and professional development by keeping up with

developments in the construction field.
C4: Leadership and Teamwork: Demonstrating leadership, collaboration, and effective communication skills within multidisciplinary teams.

## 9. Teaching and Learning Strategies

The teaching and learning strategies within the program are designed to promote effective interaction and skill development through a variety of methods, including interactive lessons, problem-based learning (PBL), laboratory experiments and field activities, the implementation of design projects and the analysis of case studies, in addition to practical training during the summer period, seminars and group discussions, with the use of simulation programs and specialized engineering applications, leading to the completion of the graduation project, which aims to achieve the integration of acquired knowledge and skills.

## 10. Evaluation methods

Oral tests, written tests, semester exams, final exams, daily assessment, practical tests, reports, daily assignments

## 11. Faculty

### Faculty Members

| Academic Rank | Specialization | | Special Requirements/Skills (if applicable) | | Number of the teaching staff | |
|---|---|---|---|---|---|---|
| | General | Special | | | Staff | Lecturer |
| Assistant professor | Civil | Construction materials | | | 2 | |
| Lecturer | Civil | Structure | | | 1 | |
| Assistant lecturer | Civil | Construction materials, structure, soil, , architecture | | | 8 | 1 |

| Professional Development |
|---|
| **Mentoring new faculty members** |
| 1- Participation in courses at higher education and scientific research institutions. |
| 2- Participation in courses within the institute. |
| **Professional development of faculty members** |
| 1- Participating in relevant scientific conferences. |
| 2- Conducting individual or joint scientific research (applied or theoretical). |
| 3- Participating in discussion panels and scientific seminars. |

| 12. **Acceptance Criterion** |
|---|
| **A- Average (evaluation rate)** |
| **2- Scientific and Professional Branch** |

| 13. **The most important sources of information about the program** |
|---|
| 1- Curriculum Guide |
| 2- Ministry of Higher Education Portal |

| 14. Program Development Plan |
|---|
| The program is subject to periodic review to ensure its quality and development, gathering feedback and suggestions from various stakeholders, such as faculty, students, alumni, and industry representatives. This process includes benchmarking programs locally and internationally, analyzing graduate outcomes and employment levels, and conducting ongoing updates to keep pace with technological developments. Within this framework, the department is committed to improving laboratories and practical training environments to enhance the practical aspect of the study and provide a modern educational environment that aligns with the requirements of modern education. |

## Curriculum Skills Map

**please tick in the relevant boxes where individual Programme Learning Outcomes are being assessed**

| Year/ Level | Course Code | Course Title | Core (C) Title or Option (O) | Programme Learning Outcomes | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Knowledge and understa | | Subject-specific skills | | | | | Thinking Skills | | | | General and Transferable Skills (or) Other skills relevant to employability and personal development | | | |
| | | | | **A2** | **A3** | **A4** | **B1** | **B2** | **B3** | **B4** | **C1** | **C2** | **C3** | **C4** | **D1** | **D2** | **D3** | **D4** |
| First Year/ Building and Construction Branch | | Construction Materials | Specialized | | | * | | | | | | | | | | | | |
| | | Engineering Mechanics | Specialized | * | | | | | | | | | | | | | | |
| | | Surveying (1) | Specialized | | | | | | | | | | | | * | | | |
| | | Concrete Materials | Specialized | | | * | | | | | | | | | | | | |
| | | Mathematics | Specialized | | | | | | | | * | | | | | | | |
| | | Computer applications | Assistive | | * | | | | | | | | | | | | | |
| | | Engineering Drawing | Specialized | | | | | | | | | | | | | | | * |
| | | Workshops | Specialized | | | | | | | | | | | | | * | | |
| | | Technical English Language | general | | | | | | | | | | | | | | * | |
| | | Human Rights & Democracy | general | | | | | | | | | | | | | | * | |

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| econd Year/ Building and Construction Branch | | Concrete technology | Specialized | | | | * | | | | | | | | | | | | |
| | | Construction technologies | Specialized | | | | | | | * | | | | | | | | | |
| | | Soil Mechanics | Specialized | | | | | | | | | | | * | | | | | |
| | | Civil Drawing | Specialized | | | | | * | | | | | | | | | | | |
| | | Surveying (2) | Specialized | | | | | | | | | | | | | * | | | |
| | | Construction Equipment | Specialized | | | | | | * | | | | | | | | | | |
| | | Computer Applications (2) | Specialized | | * | | | | | | | | | | | | | | |
| | | Quantitative Surveying | Specialized | | | | * | | * | | | | | | | | | | |
| | | Building & Prefabricated Construction | Specialized | | | | | | | | | | | | | | | * | |
| | | Project | Specialized | | | | | | | | | | | | | | | * | |
| | | general | general | | | | | | | | | | | | | | | | |

| | | | | Programme Learning Outcomes | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year / Level | Course Code | Course Title | Core (C) Title or Option (O) | Knowledge and understanding | | | Subject-specific skills | | | Thinking Skills | | | General and Transferable Skills (or) Other skills relevant to employability and personal development | | | | | | |
| First Year/ Computer | | Engineering Drawing | Specialized | | | | | | | | | | | | | | | | |
| | | Surveying and Cartography | Specialized | | | | | * | | | | | | | | | | | |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| drawing branch | | Engineering Mechanics | Specialized | * | | | | | | | | | | | | | | |
| | | Construction Materials | Specialized | | | * | | | | | | | | | | | | |
| | | Descriptive Geometry | Assistive | | | | | | | | | | | | | | | |
| | | Mathematics | Specialized | | | | | | | | * | | | | | | | |
| | | Workshops | Assistive | | | | * | | * | | | | | | | | | |
| | | Technical English Language | Assistive | | | | | | | | | | | | | | * | |
| | | Human Rights & Democracy | general | | | | | | | | | | | | | | * | |
| | | | | | | | | | | | | | | | | | | |
| Second Year/ Computer drawing branch | | Architectural Drawing | Specialized | | | | | | | | | | | | | | | |
| | | Structural Drawing | Specialized | * | | | | | | | | | | | | | | |
| | | Highway & Irrigation Drawing | Specialized | | | | | | | | | | | | | | | |
| | | Mechanical Drawing | Specialized | * | | | | | | | | | | | | | | |
| | | Electrical Drawing | Specialized | | | | | | | | | | | | | | | |
| | | Sanitary Drawing | Specialized | | | | | | | | | | | | | | | |
| | | Architectural Presentation | Specialized | | | | | | | | | | | | | | | |
| | | Quantitative Surveying | Specialized | | | | | | | | | | | | | | | * |
| | | Project | Specialized | | | | | | | | | | | * | | | | |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Computer ApplicationS | Specialized | | | | | | | | | * | | | | | | | |
| | THE CRIMES OF THE BAATH REGIME IN IRAQ | general | | | | | | | | | | | | | | | | |
| | **Arabic Language** | general | | | | | | | | | | | | | | | | |
| | **Computer 1** | general | | | | | | | | | | | | | | | | |
| | **English Language** | general | | | | | | | | | | | | | | | | |
| | **Human Rights and Democracy** | general | | | | | | | | | | | | | | | | |

- **Please tick the boxes corresponding to the individual program learning outcomes under evaluation.**

# Course Description Form

| | |
|---|---|
| **1. Course Name:** | |
| **Quantity Surveying** | |
| **2. Course Code:** | |
| **CITC229** | |
| **3. Semester / Year:** | |
| **2024/2025** | |
| **4. Description Preparation Date:** | |
| **15/7/2025** | |
| **5. Available Attendance Forms:** | |
| **Lectures** | |
| **6. Number of Credit Hours (Total) / Number of Units (Total)** | |
| **6 Hours / 4 Units** | |
| **7. Course administrator's name (mention all, if more than one name)** | |
| **Name: Dr. Saeed Khalaf Rejeb**<br>**Email: saeed_kh@ntu.edu.iq** | |
| **8. Course Objectives** | |
| **Course Objectives** | **1. Students will be able to estimate the initial costs of any structural engineering project.**<br>**2. Students will learn how to calculate the quantity of materials required for each section of the project.**<br>**3. Students will learn how to calculate units and analyze these quantities into their initial resources, along with the principles of calculating prices and costs, as well as contracting work.**<br>**4. Students will gain knowledge of engineering project management.**<br>**5. Students will be able to understand specifications.** |
| **9. Teaching and Learning Strategies** | |
| **Strategy** | • **Explain on the board.**<br>• **Explain on the visual aids using a data show.** |

**10. Course Structure**

| Week | Hours | Required Learning Outcomes | Unit or subject name | Learning method | Evaluation method |
|---|---|---|---|---|---|
| First | 6 | The student should be able to understand the meaning of estimation and identify its types. The student should be able to calculate the quantities of earthwor for foundations of various types of buildings. | Definitions of estimatio its purpose, the princip upon which it is based, and the expected benefi of the estimation proces Types of estimation, uni of measurement used fo all construction section and bill of quantities. Calculating the quantit | Lecture/P entation | Explain, discuss, ask questions |

| | | | | | |
|---|---|---|---|---|---|
| | | | of earthworks for foundations of facilities (buildings) (various typ of foundations) and explaining the bill of quantities, including the unified standard guide f these works, their specifications, and price analysis. | | |
| Second | 6 | The student will learn about the quantity surveying material and its topics, as well as ho to calculate structural paragraphs under and above the damp-proof barrier. | Calculate the quantity o structural elements und the damp-proof barrier (squaring, foundation concrete, and cubing), indicating the unified standard guide for these works, their specificatio and their respective bill quantities.<br>Calculate the quantity o structural elements abo the damp-proof barrier (paddling), including damp-proof concrete an construction above the damp-proof barrier (bricks and concrete blocks), indicating the unified standard guide f their dimensions, specifications, and their respective bill of quantities. | Solve questions the board/pre ntation | Tests, and discussion |
| Third<br>+<br>Fourth | 6<br>+<br>6 | The student will learn how to calculate the amount of reinforcing steel and the area of th wooden formwork for foundations and connecting beams in buildings. | Calculating the quantity of concrete, reinforcing steel, and wooden formwork for foundatio (structural buildings wi wall foundations and pi foundations), and providing the unified standard guide for their spans and specifications<br>Calculating the quantity of concrete, reinforcing steel, and wooden formwork for connectin beams in structural buildings below the paddle level and bridge | Solve questions the board/pre ntation | Questions an discussion |

| | | | | | |
|---|---|---|---|---|---|
| | | | over openings, analyzin prices, and providing th unified standard guide f the spans of these works | | |
| Fifth + Sixth | 6 + 6 | The student will learn how to calculate the quantity of concrete, th quantity of reinforcing steel, and the area of th wooden formwork for concrete columns. | Calculating the quantity of concrete, reinforcing steel, and wooden formwork for columns o all types, along with analyzing their prices a providing the unified standard guide and specifications. Calculating the quantity of concrete, reinforcing steel, and wooden formwork for various concrete works and special shapes, such as domes and arches. | Explanatio tests, and questions asked | Tests and discussion |
| Seventh + Eighth | 6 + 6 | The student will learn how to calculate the quantity of concrete, th quantity of reinforcing steel, and the area of th wooden formwork for various building shape such as stairs and slabs | Calculating the quantity of concrete, reinforcing steel, and wooden formwork for one-way and two-way slabs, analyzing their prices, a citing the unified standa guide for their specifications and bill of quantities. Calculating the quantity of concrete, wooden formwork, and reinforcing steel for various types of stairs, analyzing their prices, a citing the unified standa guide for their height an specifications. | Solve questions the board/pre ntation | Discussion a questions |
| Ninth + Tenth | 6 + 6 | The student will learn how to calculate the quantity of surfacing materials, plastering an whitewashing, as well a scattering and painting and how to calculate th quantity of tiles for floors. | Calculating the quantity of all types of sub-roofin work, including all type of roofing work (asphal plaster, and staircase), and providing the unifie standard guide for their dimensions and specifications. Calculating the quantity of finishing work (plaste plastering, plastering, a | Solve questions the board/pre ntation | Discussion a questions |

| | | | | | |
|---|---|---|---|---|---|
| | | | painting), porcelain tile analyzing prices, and providing the unified standard guide for their dimensions, specificatio and a schedule of quantities. | | |
| Eleventh + Twelfth | 6 + 6 | The student will learn how to calculate floorin works such as tiles, skirting boards, and marble. The student w also learn how to calculate the amount o electrical and mechani installations. | Calculating the quantity of flooring, tiling, tile backing, and cladding f facades with marble an gypsum, including the unified standard guide, specifications, and bill o quantities. Calculating the quantity of electrical and mechanical installations including the unified standard guide, specifications, and bill o quantities. | Solve questions the board/pre ntation | Tests and questions |
| Thirteen | 6 | The student will learn how to calculate the quantity of water and sanitary installations, a well as the quantity of finished construction. | Calculating the qu antit of water and sanitary installation work, analyzing and stating th standard guide for their dimensions, specificatio and bill of quantities. Calculating the quantity of construction work fo prefabricated buildings (walls and ceilings), explaining their specifications, bill of quantities, and standard guide for that. | Solve the questions the board and explai | Tests and questions |
| Fourteen h | 6 | The student will learn how to calculate the we of steel structures, analyze their prices, dimensions, and bill of quantities. | Calculating the quantity of work and some sectio of steel structures, analyzing their prices, dimensions, and bill of quantities. Contracts, contracting, and contract organizati application forms, tend forms, and instructions for contractors, maintenance periods, advances, and how to calculate them. | Explanati Presentati | Discuss and ask question |

| | | | | | |
|---|---|---|---|---|---|
| Fifteenth | 6 | The student will learn about management definitions, interperson and organizational relationships, staff responsibilities, projec organization, site planning, control, and engineering manageme of projects. The studen will also learn about project scheduling: progress charts, arrow network diagrams, and the critical path. | Definitions in management, interpersonal and organizational relationships, staff responsibilities, project organization, site planning, control, and engineering managemer of projects. Project scheduling: progress chart, arrow network diagrams, and critical path. Some applications of computer-aided construction quantity calculations. | Explanati Presentati | Discuss and ask question |

**11. Course Evaluation**

Three monthly exams (40 marks), homework in the form of arithmetic questions (4 marks), daily written and oral tests (6 marks), final exam (50 marks)

**12. Learning and Teaching Resources**

| | |
|---|---|
| Required textbooks (curricular books, if any) | - |
| Main references (sources) | المصادر: -<br>7- التخمين والمواصفات / مدحت فضيل 1977.<br>2- الدار الجديد، تصميم وتخمين، م. احمد شهاب احمد، 1978.<br>3- التخمين والمواصفات، مدحت فضيل فتح الله، الطبعة الرابعة المنقحة، 1985.<br>4- مشروع كتاب المسح الكمي / سلمى فرحان 1986<br>6- حساب الكميات، م. فواز محمد القضاة، جامعة البلقاء التطبيقية، الأردن، الطبعة الأولى، 2006.<br>7- حساب الكميات والمواصفات، م. احمد حسين أبو عودة، سل الهندسة المدنية (1)، الجزء الأول، جامعة البلقاء التطبيقية/ الهندسة التكنلوجية، الأردن، الطبعة الأولى، 2008. |
| Recommended books and references (scientific journals, reports…) | - |
| Electronic References, Websites | 1- https://www.procore.com/library/construction-estimating<br>2- https://nedesestimating.com/how-to-estimate-the-quantity-of-construction-materials /<br>3- https://www.rsmeans.com/resources/construction-cost-estimate-guide<br>4- https://www.remodelingcalculator.org/house-building-calculator / |

# Course Description Form

| | |
|---|---|
| 1. Course Name | |
| Principles of Architectural Drawing | |
| 2. Course Code | |
| **CITC221** | |
| 3. Semester/Year | |
| 2025-2026 | |
| 4. Description Preparation Date | |
| 15/7/2025 | |
| 5. Available Forms of Attendance | |
| Theoretical lectures and practical application | |
| 6. Number of Credit Hours (Total) / Number of Units (Total) | |
| 7 hours / 4 units | |
| 7. Name of the Course Leader (List all names, if there is more than one) | |
| Name: Zeina Abdulhaq Hammoudi<br>Email: zeina_aljarah@ntu.edu.iq | |
| 8. Course Objectives | |
| **Objectives** | 1. 1- To acquire a comprehensive knowledge of the components of basic architectural drawings, including horizontal plans, sections, facades, **and details**.<br>**2- To master the production of basic architectural drawings manually and digitally, in accordance with the approved technical and engineering standards.**<br>3- The student should demonstrate a commitment to accuracy, order and professionalism in the completion of architectural drawings. |
| 9. Teaching and Learning Strategies<br>**List all the teaching and learning strategies that are followed for each course** | |
| **Strategy** | • Theoretical lectures using the projector |

| | |
|---|---|
| | • Practical application in the studio using paper or drawing programmes<br>• Group discussions and class exercises |

10. Course structure **(remember all the theoretical and practical vocabulary)**

| Week | Hours | Required Learning Outcomes | Module name/theme | Teaching method | Assessment method |
|---|---|---|---|---|---|
| 1+2 | 6 | –The studer will recogni The concept of architectura drawing and types o architectura drawings -The studen recognises the basics c distributing spaces on t ground floo of a residential building | Draw a floor plan of a residentia building (Ground Floor Scale (1:50) Examples of floor plans are required residential houses | Theoretical lecture/ Practical application | **Evaluation board** |
| 3 + 4 | 6 | The student masters the distribution spaces on the first flo of a | Draw a floor plan of a residential building (first floor and roof). | Theoretical lecture Practical application | **Assessment Board+ Test** |

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|---|---|---|---|---|---|
| | | first floor of building of a residential building and master draw the ro | Scale (1:50) | | |
| 5 | 6 | The student masters the elements of Foundation and their distribution The student draws the relationship between fo dations floors and ceilings | draw foundation diagram for your studentwith dimensions. Scale (1:50) Draw sections load-bearing walls and partitio scale Drawing (1:20 Illustrated w the foundation | Theoretical lecture Practical application | **Evaluation board** |
| 6 | 6 | The student counts the holes accurately within the diagram The student designs detail the vertical openings | draw a plan of house with the numb of doors and windows, at a scale of (1:100) Draw the facades of the doors and windows, scale Drawing (1:50 | Theoretical lecture Practical application | **Evaluation board** |
| 7 | 6 | Presentatior Horizontal plans for a house Residence | Submitting paintings | Submitting paintings | **Evaluate Panels** |

| | | | | | |
|---|---|---|---|---|---|
| | | (floor plan, floor plan. first, roof, floor plan foundation | | | |
| 8 | 6 | The student should kno syllables and th types The student should able to distinguish between a section and a plan | draw a section of a residential house The staircase does not pass by a scale Drawing 1:50 | Theoretical lecture Practical applicatior | **Evaluation board** |
| 9+10 | 6 | The student should be be able to draw section pass a staircase | draw a section of a block flats passing through staircase at a scale of 1:50 scale | Theoretical lecture Practical applicatior | **Evaluation board** |
| 11 | 6 | Thestudent recognises t shapes of staircases a ways to represent | Draw types of stairs (diagram, section, interface). Scale | Theoretical lecture Practical applicatior | **Assessment board+ Test** |

| | | | | | |
|---|---|---|---|---|---|
| | | them | drawing (1:20, 1:50) | | |
| 12 | 6 | Presentatic of clip boards | Render | Submitting | **Evaluate the boards** |
| 13+14 | 6 | The student should kno Interfaces a their types The student Should distinguish between section and facade | Drawing the facade of residential hou 1:50 Examples of facades a required residential | Theoretical lecture Practical applicatior | **Evaluation board** |
| 15 | 6 | Presenting a facade fo residential house | Presentation | Presentati | **Evaluate the paintings** |

| 11. Course evaluation |
|---|
| ▪ 10 marks for daily and oral exams<br>▪ 20 marks for assignments and practical boards<br>▪ 20 marks for mid-term exams<br>▪ 50 marks: Final Examination (Theory + Practical) |

| 12. Learning and Teaching Resources | |
|---|---|
| **Required textbooks (syllabus books, if any)** | 1 - Kevin Forseth, Graphics for Architecture, New York, 1980.<br>2 - Rudolf Herz, Fribe, Drlng., Ernst Neufert Architects' Data, Britain, 1970.<br>3- John Hancock Callender, Time - Saver Standards I Architectural Design Data<br>4- Atef Al-Suhairi, Building Construction, University of Baghdad, Faculty of Engineering, 1991. |

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|---|---|
| | -5- Dr Farouk Abbas Haider, Modern Encyclopedia of Building Construction Technology, Part I and Part II |
| **References and Websites** | **Internet** |

# Course Description Form

| |
|---|
| 1. Course name: |
| Computer Applications – Computer Applications |
| 2. Course Code |
| CITC228 |
| 3. Semester / Year |
| 2025–2026 |
| 4. Description Preparation Date |
| 15/7/2025 |
| 5. Available Forms of Attendance |
| Lectures, Practical Application |
| 6. Number of Credit Hours (Total) / Number of Units (Total) |
| 6 hours / 4 units |
| 7. Name of the module leader (list all names, if there is more than one) |
| Name: Zeina Abdulhaq Hammoudi<br>Email: zeina_aljarah@ntu.edu.iq |
| 8. Course Objectives |

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|---|---|
| **Objectives** | 1- The student learns the AutoCAD interface and how customise it.<br>2- The student will be able to use the drawing, editi writing,<br>and scratching commands.<br>3- The student masters three-dimensional drawing a architectural rendering details.<br>4- The student can convert drawings to perspective a save them as an image. |

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| 9. Teaching and Learning Strategies<br>**List all the teaching and learning strategies that follow for each module** |

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| **The strategy** | - Theoretical explanation using the projector.<br>- Practical applications in the laboratory. |

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| | |

10. Course structure **(remember all theoretical and practical vocabulary)**

| Week | Hours | Required Learning Outcomes | Module Name / Topic | Method of instruction | Assessment method |
|---|---|---|---|---|---|
| 1 | 6 | Explain t importance of of the Auto cad and get to know the the interfa of t software | Introduction about AutoCAD | Practical application Setup software interface and drawin basic | **Evaluate Works** |
| 2 | 6 | Th student learns to draw shap Two-dimensiona | Drawing men | Practical application Draw Shape geometric Two-dimensiona | **Test** |
| 3 | 6 | Th student learns the Object Snap | Menu Object Snap | Practical application Geometric shapes | **Evaluate Works** |
| 4 | 6 | The stude is proficie in modifyin drawings and add texts | List Editing Modify an typing commands Text | Practical application Draw decorations | **Homework** |
| 5 | 6 | The studen can set up a scratchi | Hatch menu and Gradient | Practical application Drawing | **Evaluate** |

| | | | | | |
|---|---|---|---|---|---|
| | | post | | details Architectur and adding material symbols | **the work** |
| 6 | 6 | The studen can Determine the dimension | list Dimensions | Practical application Drawing a floor plan o house and specify dimensions | **Test** |
| 7 | 6 | Controwith specificatic s Drawing (Colour, Line type ) | Menu Properties | Practical application Drawing blueprint of a building with modificatio on the type lineand thickness | **Evaluate the work** |
| 8 | 6 | The studen can create laye (Layers) and print t drawing (Plot) | Layers typography | Drawing plot of a house and illustra layers | **Evaluate the work** |
| 9+10 | 6 | The studen will be al to create drawings three-dimensio | Principles drawing three-dimensional views a menus (3D view, view ports) | Drawing shapes triangular | **Test** |
| 11 | 6 | Thestuden draws three-dimensio surfaces | Drawing Surfaces | Practical application Drawing shapes Surfaces | **Evaluate the work** |

| | | | | | |
|---|---|---|---|---|---|
| 12 | 6 | Thestuden draws triangular shapes using drawing commands (Solids) | List (Solids) | Practical application Drawing shapes geometric Three-dimensiona | **Homewor k** |
| 13 | 6 | Manage perform Mergers Slice, Cut, and Delete (Slice, Union, Subtract) | Command(Sli , Union, Subtract) | Draw Shape triangles and apply the commands Combine, Slice and del commands | **Test** |
| 14+15 | 6 | The stud simulates the fi scene and memorises as a picture | Render (Render). perspectivea storage | Practical application Drawing building three-dimensiona building w the additi of materials and shadow (Render) and turning into a Perspective and convert to image | **Evaluate the work** |

11. Course evaluation

**Distribute marks out of 100 according to the tasks assigned to the student such as daily preparation, daily oral exams, monthly or written exams, reports... Etc.**

10 marks: Daily and oral assessments

20 marks: Daily exams

| | |
|---|---|
| 20 marks: Monthly exam<br>50 marks: Final Examination (Theory + Practical) | |
| 12. Learning and Teaching Resources | |
| **Electronic references and websites** | **https://www.autodesk.com**<br>**https://www.cadtutor.net** |

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|---|---|
| **1. Course Title:** | |
| Construction materials | |
| **2. Course Code:** | |
| CITB120 | |
| **3. Semester / Year:** | |
| 2025-2026 | |
| **4. Date of Description Preparation:** | |
| 14-7-2025 | |
| **5. Available Attendance Modes:** | |
| Lectures and Practical Applications | |
| **6. Total Credit Hours / Total Units:** | |
| Total Hours: 4 / Total Units: (3) | |
| **7. Course Coordinator Name (List all names if more than one):** | |
| **Name: Leena Jaffer sedeeq**<br>**Email: leena.j.sedeeq@ntu.edu.iq** | |
| **8. Objectives of the Course:** | |
| **Objectives** | • The student will learn the properties and manufacturing of a range of construction nater<br>their on-site installa on m<br>• The student will be able to conduct tests and compare the results with standard s ecifi<br>• The student will be able to identify the appropriate construction materials for each const<br>section and their propertie to be |
| **9. Teaching and Learning Strategies**<br>**List all the teaching and learning strategies applied for each course.** | |
| **Strategy** | • Delivering lectures using projectors and computers.<br>• Using whiteboards/chalkboards to effectively convey information.<br>• Practical sessions and demonstrations of subject-related equipment.<br>• Field visits to learn everything related to construction materials and the nec ssary tests. |

**10. Course Structure (List all theoretical and practical topics)**

| Week | Hours | Expected Learning Outcomes | Unit/Topic Name | Teaching Method | Ass M |
|---|---|---|---|---|---|
| First | 4 | The student should be able to understand the meaning of construction materials science and know the standard specifications. | General Description<br>Standard Specifications<br>Definition of Bricks, Their Properties<br>Manufacturing Methods | Lecture, Presentation | Exp Dis Que |
| Second | 4 | The student will learn about brick making and construction methods. | Types of bricks<br>Laboratory tests<br>Construction methods | Lectures, Presentation, Practical Work | Exp Dis Pr Sc Que |
| Third<br>+<br>Fourth<br>+<br>Fifth | 4+4+4 | The student will learn about the types of building blocks, their types, properties, and methods of manufacturing them. | Main Title Three: Building Blocks: Types and Properties<br>Manufacturing Methods<br>Laboratory Tests<br>Lightweight Blocks<br>Thermstone: Its Manufacture<br>Laboratory Tests | Lectures, Presentation, Practical Work | Exp Dis Pr Sc Que Cor |
| Sixth | 4 | The student will learn about the uses of stones in construction and their properties. | Main Title: Stonework, Its Uses<br>Classification<br>Engineering Properties<br>Types<br>Laboratory Tests | Lectures, Presentation, Practical Work | Q pr le exp dis pr sc que cor |
| Seventh+<br>Eighth | 4+4 | The student will learn about the types of binding materials and methods of manufacturing them. | Main Title: Binding Materials, Cement Raw Materials<br>Manufacturing Methods | Presentation, Lectures | Exp Dis Que |
| Ninth | 4 | The student will learn about the properties, uses and types of cement. | Main Title: Cement Main Title: Cement's Main Types<br>Types' Characteristics<br>Uses | Lectures, Presentation, Conducting Experiments | Exp Dis Pr |
| Tenth<br>+ Eleventh<br>Twelfth+<br>Thirteenth | 4+4+4+4 | The student will learn about cement products, their manufacture and benefits. | Main Title: Cement Products Concrete Pipes Manufacturing, Benefits<br>Concrete Slabs Manufacturing, Uses<br>Laboratory Tests | Lecture, Presentation | Exp Dis Que |

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|---|---|---|---|---|---|
| Fourteenth | 4 | The student learns about the types of steel. | Main Title: Structural Steel<br>Reinforcing Steel<br>Shalman<br>Tensile Testing of Steel | Lectures, Presentation, Conducting Experiments | Exp<br>Dis<br>Pr<br>Se<br>Que<br>Cor |
| Fifteenth | 4 | The student will learn about the features and characteristics of environmentally friendly buildings.<br>The student will learn about sustainable construction materials.<br>The student will learn about the advantages and disadvantages of residential complexes. | Main Title:<br>Environmentally Friendly Buildings: Its Features Characteristics<br>Sustainable Construction Materials: Their Properties Tests<br>Characteristics of Residential Complexes | Lecture, Presentation | Exp<br>Dis<br>Que |

| **11. Course Evaluation** | |
|---|---|
| Four monthly exams (60 marks), homework assignments consisting of calculation questions (20 marks) preparatio reports related to the topics covered (10 marks), daily oral quizzes (10 marks) | |
| **12. Learning and Teaching Resources** | |
| **Required Textbooks (Course textbooks, if available)** | **Jo**<br><br>**4 .Minke, Gernot. 2000. Earth Construction Handbook: Building Material Earth in Modern Architecture. Southa United Kingdom: WIT Press.**<br><br>**5 .Kapoor, Raval , Pitroda ,Vallabh Vidyanagar , Gujara .(04/Apr2022).**<br><br>**AN EXPERIMENTAL STUDY ON LEGO – INSPIRED BLOCK International Research Journal of Engineering Technology (IRJET) Volume: 09, P 892.** |
| **References and Websites** | **https://www.hnjournal.net/ar/4-4-18/** |

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|---|---|
| 13. Course Name : Advanced Surveying | |
| | |
| 14. Course Code : CITB223: | |
| | |
| 15. Semester : 2024/ 2025 | |
| | |
| 16. Academic Recipe Preparation Date :24/7/2025 | |
| | |
| 17. Available Form OF Attendance : In- Person Lectures | |
| | |
| 18. Number OF Credit Hours /Number Of Unite : 5 Hours | |
| | |
| 19. Course Supervisor Name : Salim .A.Khalid | |
| :E- mail : salim.a.k@ntu.edu.iq | |
| 20. Course Objectives | |
| The Objective | **1- Enable the Student to install, opera and take reading of variouse Surveyi device , such as the theodilators, T total station ,and leveling devices.**<br>**2- Enable the student to raise and lov engineering drawings of buildng projects, and horizontal and vertic curves.**<br>**3- Enable the student to calculate t volumes and quantities of excavati and burial earthworks for engineeri projects.** |

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| 21. | Teaching and learning strategies |
| Strategies | **Using explanation on the board displaying slides on the data show device, practical applications on the site, conducting daily and semester exams, and preparing questions through homework, in addition to preparing reports on practical exams.** |

22. Course Structure ( all practical and theoretical courses)

| The week | hours | Required Learning Outcomes | Name of Unit/Or Topic | Teaching method | Assessment Method |
|---|---|---|---|---|---|
| The first is theoretical | 2 | Learn how to calculate the height of the cut and burial for longitudinal and transverse sections of roads and engineering projects, such as excavations and others. | Calculating levels and excavation and backfill heights for upgrading plans and construction projects. | Lecture and drawing plans for the road or project | Explain how to read a calculation plan in the form of rules and tables |
| The second is theoretical | 2 | Finding the volumes of soil quantities for longitudinal and transverse sections using the mathematical laws of trapezoids, rectangles, and triangles | Calculating levels and excavation and backfill heights for road plans and construction projects. | Solve questions on the board/presentation | Exercises, questions and homework |
| The third is practical | 3 | Learn how to set up the theodolite, zero, aim, and read horizontal angles. | Installing the theodolite, aiming at targets, and reading horizontal angles | Preparing reports and gaining skills in the field of work | Through skills assessment and reporting |
| The forth is practical | 3 | Learn about the types of polygons and how to measure and correct them. | Polygons: Types of polygons, their purpose is to measure the internal | Explanation with drawings and problem solving | Solve homework and questions from sources and discuss |

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|---|---|---|---|---|---|
| | | | angles of a closed polygon and the method of correcting the angles | | |
| The fifth is theoretical | 2 | Learn how to lift a polygon, measure angles, and indent it. | Measuring the lengths of the polygon and filling the polygon | Explanation with questions and diagrams | Solve exercises and discuss |
| The fifth is practical | 3 | Raising a building inside a polygon with a drawing of its plan | Raising a building inside a closed polygon with corrections and drawing procedures | On-site practical training | Skills assessment, report writing, drawing a diagram using AutoCAD |
| The sixth is theoretical +practical | 2+3 | Learn how to calculate the horizontal and vertical components of the sides of a closed polygon and how to correct them. | Calculating the horizontal and vertical components of the sides of a closed polygon and methods for correcting them | Explanation with exercises and solving examples | Solve questions |
| The seventh is theoretical | 2 | Learn how to calculate the horizontal and vertical components of the sides of an open polygon and how to correct them. | Calculating the horizontal and vertical components of the sides of an open polygon and methods | Explanation with exercises and solving examples | Solve questions and take a test |

| | | | | | |
|---|---|---|---|---|---|
| | | | for correcting it | | |
| The eighth is theoretical | 2 | Conduct a semester selection for the above lectures. | | | Evaluation of answer |
| The eighth is practical | 3 | Learn how to read vertical angles using a theodolite. | Measuring vertical angles | Do exercises to measure vertical angles above and below the horizon. | Do site exercises on geometric landmark |
| The ninth is theoretical | 2 | Learn how to find the height of a target from a reachable point and from an unreachable point. | Finding the height of a building using a theodolite | Explanation and solution of examples supported by diagrams | Doing homework |
| The ninth is practical | 3 | Learn how to find the height of a building from an inaccessible point, as well as how to find the height of a building from an accessible point using a theodolite. | Finding the height of a building using a theodolite | Practical exercise | Report with skills assessment |
| The tenthis theoretical | 2 | Learn about the types of horizontal road curves and their calculation methods. | Horizontal curves: types and methods of calculating them | Explanation and illustrative figures, solving examples | Solve examples with homework |
| The tenthis practical | 3 | Simple circular curve projection using a tape measure | Simple circular curve projection | Practical exercise | Skills assessment with report |
| The eleventh is theoretical | 2 | Learn how to calculate complex and inverse curves. | Compound circular curves | Explanation with examples and illustrative diagrams | Work examples, discussion and homework |
| The eleventh is practical | 3 | Projecting a simple circular curve using a theodolite and a tape measure | Circular curved projection using the theodolite | Practical exercise | With report with skills assessment |
| Twelft | 2 | Learn how to study | vertical | Explanatio | Solve |

| | | | | | |
|---|---|---|---|---|---|
| h theoretical | | convex and concave vertical curves. | curves | n, clarification and solution of questions | questions and discuss with homework |
| Twelfth practical | 3 | Install, operate and take readings of the total station | Total ststion instrument | Explanation, clarification and solution of questions | Solve questions and discuss with homework |
| Thirteenth theoretical | 2 | Conducting a theoretical semester exam | | | |
| thirteenth practical | 3 | Learn how to enter coordinates and the height of the marker for point (B.M) | Entering data and reading coordinates for the total station device | Practical exercise | Evaluation work with report |
| fourteenth | 3+2 | Measuring distances and projecting coordinates for the total station device | Measuring distances and projecting coordinates | Practical exercise | Evaluation work with report |

23. Course Evaluation

Two semester exams (25 marks), homework in the form of arithmetic questions (5 marks), preparing reports on the practical tests that were explained (10 marks), practical tests (10 marks), the effort is 50

24. . Learning and teaching resources

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|---|---|
| Required textbooks (curriculum books, available) | 1- Surveying Using the Integrated Station for Construction Projects / Authored by Dr. Ali Abdul Amir Al-Ramahi.<br>2- AASHTO Book<br>3- Construction Surveying, translated |

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| | by Dr. Abdul Sattar Abdul Karim and Labib Nasef Salloum |

# Course Description Form

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|---|---|
| 25. Course Name : drawing roads | |
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| 26. Course Code :CIT230 | |
| | |
| 27. Semester : 2024/ 2025 | |
| | |
| 28. Academic Recipe Preparation Date :26/7/2025 | |
| | |
| 29. Available Form OF Attendance : In- Person Lectures | |
| | |
| 30. Number OF Credit Hours /Number Of Unite : 4 Hours | |
| | |
| 31. Course Supervisor Name : Salim .A.Khalid | |
| :E- mail : salim.a.k@ntu.edu.iq | |
| 32. Course Objectives | |
| The Objective | **1- The student will be able to read and draw the components rigid and flexible roads using drawing on the board.**<br>**2- The student can read and draw open irrigation canals.**<br>**3- The student can draw road components using a computer.**<br>**4- The student will be able to draw various types of horizontal a vertical curves, retaining walls, and irrigation intersections several levels using drawing on the board and the AutoC program.** |
| 33. Teaching and learning strategies | |
| Strategies | **Using explanation, drawing on the board, slide show (PowerPoint), drawing on the board, AutoCAD program, submitting drawing boards during the lecture, as well as assigning the student to draw boards as homework, the system of daily and semester exams, and home exercises for questions and examples.** |

| 34. Course Structure ( all practical and theoretical courses) | | | | | |
|---|---|---|---|---|---|
| The week | hours | Required Learning Outcomes | Name of Unit/Or Topic | Teaching method | Assessment Method |
| first | 4 | Learn the symbols and terms used in road drawing. | Technical terms and symbols used in drawing roads and transportation | Explanation, clarification and discussion | Drawing on the board during the lesson. Evaluation on the board, speed and skill. |
| second | 4 | Cross section drawing of a flexible mesh road including road components, layer thickness and side slope of the road | Cross section drawing of flexible road with all details | Explain and draw on the board and use slide show | Drawing on the board during the lesson, training the student on the correct drawing method, and presenting the board in addition to the homework. |
| Third | 4 | Drawing of a cross-section of a solid road including road components, layer thickness and side slope of the road | Solid road cross section drawing with all details | Explain and draw on the board and use slide show | Drawing on the board during the lesson, training the student on the correct drawing method, and presenting the board in addition to the homework. |
| Fourth and fifth | 4 | Learn how to draw a longitudinal section of a road, drawing the | Draw a longitudinal section of a road | Explaining the method of drawing and using | Convert levels and stations into |

| | | | | | |
|---|---|---|---|---|---|
| | | construction line and indicating the cutting and burial areas. | containing cutting and burial areas, station numbers, and levels. | illustrations | longitudinal section diagrams |
| sixth | 4 | Use AutoCAD to draw a cross-section of the flexible road with details and markings on the plan according to engineering specifications. | Using AutoCAD to draw a cross section of a road | Explanation of using drawing tools | Computer exercise and skills assessment |
| seventh | 4 | Learn about the types of horizontal curves, methods of drawing them, their components, and methods of calculating them. | Circular horizontal curves | Explain with the help of pictures, diagrams, and drawing a curve on the board. | Draw a simple circular curve on the board, using the calculators and the effect on the components of the curve, and specifying the starting and ending points and the point of intersection of the tangents. |
| eighth | 4 | First semester exam | | | |
| Ninth and tenth | 4 | Learn how to draw concave and convex vertical curves, perform calculations, and know the components of curves. | vertical curves | Explanation and method of drawing on the board and using slides and pictures | Draw a concave and convex vertical curve from the work of computer and the effect on the |

| | | | | | |
|---|---|---|---|---|---|
| | | | | | components. Provide boards with homework. |
| eleventh | 4 | Learn about the types of retaining walls, their uses, components, and reinforcement methods. | Retaining walls, their components, types, and distribution of iron reinforcement | Explanation with the help of pictures and diagrams | Drawing of a cantilever retaining wall with details of the reinforcement steel and components of the wall, submitting a board with homework |
| Twelfth | 4 | Learn how to draw a longitudinal and cross-sectional view of a bridge with the distribution of reinforcing steel. | Drawing longitudinal and cross-sectional drawings of box arches | Explanation on the blackboard with the help of pictures and slides | Box bridge drawing with details |
| Thirteenth | 4 | Second semester exam | | | |
| fourteenth | 4 | Learn how to draw open, lined and unlined irrigation canals. | drawing open irrigation channels | Explanation with diagrams and pictures | Irrigation canal drawing with details |
| fifteenth | 4 | Testing using AutoCAD drawing | | | |

35. Course Evaluation

Midterm exam (30 marks) Boards, attendance and homework (20 marks) The effort is 50

36. . Learning and teaching resources

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|---|---|
| Required textbo (curriculum books, available) | 4- Road Irrigation by Hassan Muhammad Ali Dada - Koker Dakhil Al-Asadi<br>5- AASHTO Book |

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|---|---|
| | 6- Preparation Workbook - Louay Ali Taha |