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

٢٠٢٤-2025

Introduction

The educational program is considered a coordinated and organized package of courses that include procedures and experiences structured into academic units. Its primary purpose is to build and refine graduates' skills, making them qualified to meet the requirements of the labor market. The program is reviewed and evaluated annually through internal or external auditing procedures and mechanisms, such as the External Examiner Program.

The academic program description provides a concise summary of the program's key features and its courses, highlighting the skills intended to be developed in students, based on the objectives of the academic program. The importance of this description lies in the fact that it represents the cornerstone for obtaining program accreditation. It is prepared by the teaching staff under the supervision of the scientific committees within the academic departments.

This guide, in its second edition, includes a description of the academic program after updating the components and sections of the previous guide in light of developments in the educational system in Iraq. It incorporates the description of academic programs in their traditional formats (annual, semester-based), in addition to adopting the unified academic program description issued under the directive of the Studies Directorate (Letter No. T M3/2906, dated 3/5/2023), regarding programs that adopt the Bologna Process as the foundation of their framework.

In this regard, we can only emphasize the importance of writing accurate descriptions of academic programs and courses to ensure the sound progress of the educational process .

Concepts and Terminology

Academic Program Description:

Provides a concise summary of the program's vision, mission, and objectives, including a precise description of the intended learning outcomes based on specific learning strategies.

Course Description:

Provides a brief overview of the main features of the course and the expected learning outcomes that the student is required to achieve, demonstrating whether the student has maximized the available learning opportunities. It is derived from the academic program description.

Program Vision:

An ambitious outlook for the future of the academic program, aiming to make it advanced, inspiring, motivating, realistic, and applicable.

Program Mission:

A concise explanation of the objectives and activities necessary to achieve them, while also defining the developmental paths and directions of the program.

Program Objectives:

Statements that describe what the academic program intends to achieve within a specific timeframe. These objectives must be measurable and observable.

Curriculum Structure:

All the courses/subjects included in the academic program, according to the adopted learning system (semester, annual, Bologna Process). This includes requirements (Ministry, University, College, or Academic Department) along with the number of credit units.

Learning Outcomes:

A coherent set of knowledge, skills, and values acquired by the student upon successful completion of the academic program. The learning outcomes of each course must be defined in a way that aligns with and supports the overall objectives of the program.

Teaching and Learning Strategies:

The strategies used by faculty members to develop student teaching and learning. These are planned approaches followed to achieve learning objectives, describing all in-class and extracurricular activities designed to attain the program's intended learning outcomes.

نموذج وصف البرنامج الأكاديمي

اسم ألجامعة جامعة ..التقنية الوسطى..

الكلية/ كلية التقنية الهندسية بغداد.....

القسم ألعلمي.... قسم هندسة تقنيات البناء والإنشاءات.....

اسم البرنامج الأكاديمي: هندسة تقنيات البناء والإنشاءات.....

اسم الشهادة ألنهائية: بكالوريوس في هندسة تقنيات البناء والإنشاءات.

النظام ألدراسي: نظام سنوي

تاريخ اعداد الوصف: **4/9/2024**

تاريخ ملء الملف:**16/9/2024**

اسم رئيس القسم : أ.د. زينب هاشم

التاريخ 2024 /9/16

التوقيع

دقق الملف من قبل

شعبة ضمان الجودة والأداء الجامعي

اسم مدير شعبة ضمان الجودة والأداء الجامعي:

التاريخ ٢٠٢٤/٩/١٦

التوقيع

مصادقة السيد العميد

التاريخ

التوقيع

1. Program Vision

The Technical Engineering College in Baghdad seeks to prepare graduates in the field of engineering technologies, particularly in Construction and Building Engineering Technology, to work in government sectors and to apply their specialization effectively in practical and applied fields.

2. Program Mission

The program aims to prepare and graduate pioneering scientific and leadership competencies in the field of Construction Engineering Technology, and to contribute to the advancement of knowledge through scientific research in construction and building technology. It also seeks to serve the local, regional, and international community, while training and refining students' minds scientifically and intellectually. Furthermore, the program emphasizes social and cultural values and responds to the requirements of the local labor market.

3. Program Objectives

- To recognize, understand, and study engineering problems in the field of Construction and Building Engineering.
- To address and analyze the impact of economic and engineering challenges in the construction and building sector.
- To understand and study the influence of modern engineering designs on applications in construction and building engineering.
- To develop the ability to produce modern engineering designs that meet required needs within specific constraints.
- To acquire the ability to conduct and implement appropriate measurements and tests, ensuring quality, and to analyze and interpret results in the field of construction and building engineering.

4. **Program Accreditation**
The program accreditation file was submitted on 22-08-2024.

5. **Other External Influences**
None.

6. **Program Structure**				
Program Component	**Number of Courses**	**Credit Units**	**(%) Percentage**	*** Notes**
Institutional Requirements	٧	٢١	١٠,٦	Primary
College Requirements	٧	٣٤	١٧,٢	Primary
Department Requirements	٢٦	١٤٣	٧٢,٢	Specialized
Summer Training	٢	–		Specialized, non-credit
Others	None			

٧. وصف البرنامج						
السنة / المستوى	رمز المقرر أو المساق	اسم المقرر أو المساق	الساعات المعتمدة			
			نظري	عملي	مجموع	وحدة
٢٠٢٤-٢٠٢٥ / الاول						
نظام سنوي	BCET100	Construction Materials	٢	٣	٥	٧
	TEC100	Engineering Mechanics	٢	٢	٤	٦
	BCET101	Surveying (١)	٢	٣	٥	٧
	TEC101	Engineering Drawing		٦	٦	٤
	TEC102	Applied Mathematics	٢	٢	٤	٦
	TEC103	Mechanical and Civil Workshops		٦	٦	٤
	TEC104	Computer Fundamentals	١	٢	٣	٤
	BCET102	Engineering Geology	٢		٢	٤
	MTU100	Human Rights				

	MTU101	English Language	٢		٢	٤
	MTU102	Arabic Language	٢		٢	٤
			٢		٢	٤

٧- وصف البرنامج						
السنة / المستوى	رمز المقرر أو المساق	اسم المقرر أو المساق	الساعات المعتمدة			
			نظري	عملي	مجموع	وحدة
٢٠٢٤-٢٠٢٥ / الثاني						
نظام سنوي	BCET200	أنشاء مباني	٢	٢	٤	٦
	BCET201	تقنية خرسانة ١	٢	٢	٤	٦
	BCET202	مساحة ٢	٢	٣	٥	٧
	TEC200	رياضيات متقدم	٢	٢	٤	٦
	BCET203	مقاومة مواد	٢	٢	٤	٦
	BCET204	ميكانيك موائع	١	٢	٣	٤
	BCET205	مبادئ حاسبة١	١	٢	٣	٤
	BCET206	تقنية صناعه	٢		٢	٤
	TEC201	تدريب منهجي				
	MTU200	اللغة الانكليزية	٢		٢	٤

٧- وصف البرنامج						
السنة / المستوى	رمز المقرر أو المساق	اسم المقرر أو المساق	الساعات المعتمدة			
			نظري	عملي	مجموع	وحدة
٢٠٢٤-٢٠٢٥ / الثالث						
نظام سنوي	BCET300	تحليل وتصميم المنشات ١	٢	٢	٤	٦
	BCET301	تقنية خرسانة ٢	٢	٢	٤	٦
	BCET302	ميكانيك تربه	٣	٢	٥	٨
	BCET303	أدارة هندسية	٢	٢	٤	٦
	BCET304	نظرية منشأت	٢	١	٣	٥
	BCET305	التحليل الهندسي	٢	١	٣	٥
	BCET306	هندسة الطرق	٢	٢	٤	٦
	BCET307	تطبيقات الحاسبة٢	١	٢	٣	٤
	TEC300	تدريب منهجي				
	MTU300	اللغه الانكليزية	٢		٢	٤

٧- وصف البرنامج					
السنة / المستوى	رمز المقرر أو المساق	اسم المقرر أو المساق	الساعات المعتمدة		
			نظري	عملي	مجموع	وحدة
٢٠٢٤-٢٠٢٥ / الرابع						
نظام سنوي	BCET400	تحليل وتصميم المنشات ٢	٢	١	٣	٥
	BCET401	تقنية هندسة الاسس	٢	٢	٤	٦
	BCET402	تصميم منشآت فولاذية	٢	١	٣	٥
	BCET403	تخمين ومواصفات	٢	٢	٤	٦
	BCET405	هندسة البيئة	٣	٣	٦	٩
	BCET406	رسم انشائي		٣	٣	٣
	BCET407	هندسة الطرق	٢	٢	٣	٤
	BCET408	تطبيقات الحاسبة٢	١	٢	٣	٤
	TEC400	المشروع		٦	٦	٤
	MTU400	اللغه الانكليزية	٢		٢	٤
	MTU401	أخلاقيات مهنه	١		١	٢

8. **Expected Learning Outcomes of the Program**	
Knowledge	
	A1 – Keeping up with the design and supervision of all aspects of engineering projects such as buildings, bridges, roads, airports, tunnels, dams, hydraulic structures, prefabricated units, and prestressed concrete units.

	A2 – Conducting all field, site, and laboratory tests (destructive and non-destructive) on construction materials and soil, interpreting the results, and verifying compliance with standard specifications. A3 – Reading, preparing, and implementing structural and architectural drawings, calculating quantities and costs, and preparing contracts for projects using computer applications extensively. A4 – Engaging with all new and useful developments in construction engineering and adapting them into practice.
Skills	
	B1 – Handling modern construction materials, locally available alternatives,

	admixtures in concrete works, and soil stabilization techniques for major projects. B2 – Organizing and managing different construction projects using modern methods and computer applications, with familiarity in professional construction practices, in addition to studying construction machinery in terms of productivity, operating costs, and usage methods. B3 – Extensively using modern surveying instruments to prepare maps and topographic drawings, subdivide lands, determine road alignments, and produce longitudinal and cross-sections.
Values	
	C1 – Developing students' ability to share ideas in the field of construction

	.engineering
	C2 – Ensuring continuity in students' ability to find solutions to construction engineering problems. C3 – Acquiring skills derived from the use of measurement instruments across different disciplines. C4 – Adhering to quality systems and required specifications.

9. Teaching and Learning Strategies

1. Explaining scientific material to students in detail.
2. Engaging students in solving problems and hydraulic design exercises.
3. Conducting discussions and dialogues related to course topics.
4. Traditional theoretical delivery using a whiteboard, with emphasis on the "how" and "why" approach in alignment with the course syllabus.
5. Theoretical delivery using a **data show device (projector)**, also employing the "how" and "why" approach based on the course syllabus.
6. Laboratory instruction using specialized instruments for measuring fluid properties in static and dynamic conditions.

10. Assessment Methods

- Weekly, monthly, and daily examinations, as well as the final annual examination.
- Direct questioning using the "how and why" approach during theoretical and practical lectures.
- Surprise (unannounced) quizzes during theoretical and practical lectures.
- Midterm examinations for both theoretical and practical components.
- Final examinations for both theoretical and practical components.

11. Teaching Staff

Faculty Members

Academic Rank	Specialization (General)	Specialization (Specific)	Specific Requirements / Skills (if any)	Number of Faculty (Permanent)	Number of Lecturers
Professor	Civil Engineering	Construction Materials	–	1	–
Professor	Civil Engineering	Engineering Management	–	1	–
Professor	Civil Engineering	Foundations	–	1	–
Professor	Water Resources	Hydraulics	–	1	–
Assistant Professor	Civil Engineering	Structures	–	1	–
Assistant Professor	Civil Engineering	Soil Mechanics	–	1	–
Lecturer	Civil Engineering	Foundations	–	1	–
Lecturer	Civil Engineering	Construction Materials	–	2	–
Lecturer	Civil Engineering	Structures	–	1	–
Lecturer	Civil Engineering	Environmental Engineering	–	1	–
Assistant Lecturer	Civil Engineering	–	–	9	–

Professional Development

Guidance for New Faculty Members

1. Commitment to official working hours.
2. Adherence to lecture and examination schedules.
3. Monitoring the progress of lectures and completion rates.

Professional Development for Faculty Members

- Encouraging the completion of scientific research and supporting faculty members.
- Encouraging new faculty members to participate in scientific activities.
- Promoting cooperation and the exchange of academic expertise with universities and scientific centers.
- Participating in scientific activities related to continuing education.

12. Admission Criteria

Graduates of secondary education from the Scientific Branch and the Industrial Branch.

13. Main Sources of Information about the Program

- The department's webpage on the website of the Technical Engineering College – Baghdad / Middle Technical University.
- The Guide of the Department of Construction and Building Engineering.
- The website of the Ministry of Higher Education and Scientific Research.

14. Program Development Plan

- Using direct questions about how situations occur and their causes.
- Conducting surprise (unannounced) quizzes.
- Administering practical examinations.
- Developing laboratory measuring instruments to assess additional cases.

Program Skills Matrix

Expected Learning Outcomes of the Program

Year / Level	Course Code	Course Title	Primary / Elective	Knowledge (A)	Skills (B)	Values (C)
First Year	BCET100	Construction Materials	Primary	A1, A2	B1, B2	C1, C2
First Year	TEC100	Engineering Mechanics	Support	A1, A3	B1, B3	C1, C3
First Year	BCET101	Surveying I	Primary	A2, A3	B2, B3	C2
First Year	TEC102	Engineering Drawing	Primary	A1, A4	B3	C1, C2
First Year	TEC103	Mathematics	Support	A2	B1	C2
First Year	TEC104	Workshops	Support	A3	B1, B2	C2, C3
First Year	BCET102	Engineering Geology	Support	A1, A2	B1	C2
First Year	MTU100	Human Rights	Support	A4	-	C3
First Year	MTU101	English Language	Support	A2	B2	C1
First Year	MTU102	Arabic Language	Support	A3	-	C2
First Year	TEC104	Principle of computer	Support	A3	-	C2
Second Year	BCET200	Building Construction	Primary	A1, A2	B1, B3	C1, C2
Second Year	BCET201	Concrete Technology	Primary	A2, A3	B2	C1
Second Year	BCET202	Surveying II	Primary	A3	B2, B3	C2
Second Year	BCET203	Strength of Materials	Primary	A1, A4	B1, B2	C1, C3
Second Year	BCET204	Fluid Mechanics	Support	A2, A3	B3	C2
Second Year	BCET206	Technology of Construction Materials Industry	Primary	A1, A2	B1, B2	C1
Second Year	TEC200	Mathematics II	Support	A2	B1	C2

Second Year	BCET205	Computer application	Support	A1, A2	B2	C1
Second Year	TEC201	Field Training	Support	A3	B3	C2
Second Year	MTU200	English Language II	Support	A2	B2	C1
Third Year	BCET300	Structural Analysis & Design	Primary	A1, A2, A3	B1, B2	C1, C2
Third Year	BCET301	Concrete Technology II	Primary	A2, A3	B1	C1
Third Year	BCET302	Soil Mechanics	Primary	A1, A2	B2, B3	C2
Third Year	BCET304	Structural Theory	Primary	A3	B1, B2	C1
Third Year	BCET305	Engineering Analysis	Primary	A2, A3	B3	C2
Third Year	BCET306	Highway Engineering	Primary	A1, A2	B1, B2	C3
Third Year	BCET307	Computer Applications	Support	A3	B2	C1
Third Year	TEC300	Field Training II	Support	A2, A3	B1	C2
Third Year	MTU300	English Language III	Support	A1	B2	C2
Third Year	BCET308	Engneering management amd construction equipment	Primary	A1, A2	B1, B2	C1, C2
Third Year	BCET309	Analysis and Design of concrete structure I	Primary	A1, A2	B1, B2	C1, C2
Fourth Year	BCET400	Estimation and Specification	Primary	A1, A2	B1, B3	C1
Fourth Year	BCET401	Foundation Engineering	Primary	A2, A3	B2	C2
Fourth Year	BCET402	Structural Steel Design	Primary	A1, A4	B1, B2	C1, C3
Fourth Year	BCET405	Environmental Engineering	Primary	A3	B3	C2
Fourth Year	BCET406	Construction Drawing	Primary	A1, A2	B2, B3	C1
Fourth Year	BCET407	Concrete Design II	Primary	A2, A3	B1	C3

Fourth Year	BCET408	Computer Applications II	Support	A1, A2	B2	C1
Fourth Year	TEC400	Graduation Project	Primary	A4	B4	C3
Fourth Year	MTU400	English Language IV	Support	A2	B2	C1
Fourth Year	MTU401	Professional Ethics	Support	A4	-	C3
Fourth Year	BCET409	ISO	Support	A4	-	C3

Course Description Template

Third Academic Year

No.	Course Title	Description
1	**Analysis and Design of Concrete Structures (1)**	Enables students to understand the methods of design and performance of reinforced structural elements.
2	**Concrete Technology (2)**	Introduces students to the properties of fresh and hardened concrete; durability of concrete; mix design; special types of concrete; as well as field testing methods.
3	**Soil Mechanics**	Introduces students to the nature, types, and components of soils and their engineering properties, as well as soil behavior under stresses, water flow through soils, the use of soil as a construction material, and related engineering tests.
4	**Construction Machinery and Engineering Management**	Provides students with the fundamentals of engineering management, including planning and cost estimation, along with technical skills and the study of catalogs for construction equipment used in engineering projects.
5	**Structural Theory**	Introduces students to types of structures and their stability, methods of measuring deformations of structures under loads, and analysis of internal forces for both determinate and indeterminate structures.
6	**Engineering Analysis**	Teaches students advanced mathematical theories and their applications in structural engineering.
7	**Highway Engineering**	Introduces students to the geometric and structural design of flexible and rigid pavements, as well as the site works required for road construction and maintenance.
8	**Computer Applications (2)**	Enables students by the end of the year to complete all steps of project planning, prepare Primavera schedules, create new projects, set up calendars, define activity codes, add and organize activities, establish logic links, create and assign resources, evaluate projects using resources, print reports, and apply engineering software related to the theories and principles taught in earlier courses.
9	**English Language (3)**	Develops students' speaking skills and understanding of fundamental grammar, while enabling them to use essential technical vocabulary in their field and to communicate effectively with other engineers.
10	**Field Training**	Provides practical experience in applying the knowledge and skills acquired in previous courses through supervised training in real engineering environments.

Fourth Academic Year

No.	Course Title	Description
1	**Analysis and Design of Reinforced Concrete Structures (2)**	Introduces students to the design of reinforced concrete, enabling them to understand the behavior of reinforced concrete and to design its practical components.
2	**Foundation Engineering Technology**	Provides students with the fundamentals of foundation engineering, including soil investigation, calculation of soil bearing capacity, and the selection and design of various types of foundations.
3	**Steel Structure Design**	Enables students to understand the behavior and design of different types of structural steel connections, while gaining practical experience in designing simple steel structures.
4	**Estimation, Specifications, and Contracts**	Equips students with the ability to prepare both preliminary and detailed estimates for buildings, determine appropriate measurement methods, and analyze unit prices of various construction works. Students will also learn to write technical specifications for civil engineering works and gain comprehensive knowledge of contract types and their general and special conditions.
5	**Environmental Engineering**	Applies principles of mass and energy balance to environmental relationships and processes. Covers ecosystem identification, environmental risk assessment, analysis and design of water distribution networks and wastewater disposal systems, water and wastewater treatment methods, air pollution control techniques, solid waste management technologies, and the application of green energy principles in sustainable development.
6	**Structural Drafting**	Introduces students to drafting all types of details related to civil works (structural drawings for concrete and steel), in addition to reading and executing pre-prepared projects and plans.
7	**ISO (Quality Standards)**	Provides students with knowledge of quality and total quality management, its elements, specifications, standardization, classification, and applications, along with international standards systems (ISO).
8	**Computer Applications (3)**	Introduces students to structural analysis and design of various types of structures using advanced software such as STAAD.Pro, CONCAD, SAFE, CSI Bridge, Prokon, Epanet, and AutoCAD Land Development Desktop.
9	**English Language (4)**	Helps students effectively write their graduation projects. Focuses on the fundamental grammar concepts of academic writing, with practical applications for writing reports and projects.

No.	Course Title	Description
10	**Professional Ethics**	Introduces students to general ethics and engineering professional ethics. Enhances students' awareness to recognize the ethical dimensions surrounding the practice of their future profession, and fosters a genuine commitment to moral responsibility.
11	**Graduation Project**	Students will be able to design, calculate quantities, and prepare architectural, structural, sanitary, and electrical drawings and details for a specific civil engineering project.

Course Description: Analysis and Design of Reinforced Concrete Structures (١)

1. Educational Institution
Technical Engineering College – Baghdad

2. Department
Building and Construction Engineering Technologies

3. Course Name / Code
Analysis and Design of Reinforced Concrete Structures (1) / BCET301

4. Mode of Attendance
Lecture

5. Academic Year / Semester
2024–2025

6. Total Study Hours
Total: 120 hours

7. Date of Preparation
11/05/2024

8. Course Objectives

This course aims to provide students with the theoretical knowledge and practical skills necessary to design and analyze different structural elements, understand their structural behavior, and read structural drawings of various elements in civil engineering projects, in accordance with engineering standards and specifications. By the end of the course, students are expected to achieve the following:

1. Enable students to design and analyze structural elements such as beams, columns, and slabs, and determine their load-bearing capacity.
2. Develop students' ability to understand the structural and mechanical behavior of essential building elements such as foundations, columns, beams, slabs, walls, and stairs.
3. Enhance students' skills in preparing executive designs of reinforced concrete elements, including reinforcement detailing and sectional drawings.
4. Enable students to use structural symbols, terminology, and measurement systems according to local and international engineering codes (such as ACI or the Iraqi Code).
5. Introduce students to methods of presenting structural information in drawings to ensure clarity, accuracy, and ease of implementation on-site.
6. Link design aspects with structural calculations and executive drawings, enabling students to represent design concepts in drawings ready for execution.

7. Promote professional and ethical commitment through adherence to technical specifications and instructions in preparing structural designs.

9. Affective and Value-based Objectives

The course aims to develop a set of professional values, attitudes, and behaviors that strengthen students' professional commitment, teamwork abilities, and sense of responsibility in the engineering environment.

At the emotional (affective) level:

1. Enhance accuracy and attention to detail in producing structural designs.
2. Develop responsibility and discipline in completing engineering tasks within given deadlines.
3. Foster concern for the quality of technical and artistic work, with a commitment to continuous improvement.
4. Build self-confidence and pride in engineering achievements, whether individual or collaborative.
5. Enhance flexibility and the ability to accept constructive criticism to improve performance in design preparation.

At the ethical and professional level:

1. Reinforce principles of scientific and professional integrity in preparing designs according to specifications without falsification or negligence.
2. Respect intellectual property rights when dealing with existing design models.
3. Strengthen teamwork and cooperation in executing joint design projects.
4. Respect engineering safety standards in design planning and drawing execution.
5. Develop adherence to local and international technical/engineering codes and regulations in preparing drawings.
6. Instill sustainability awareness by understanding the role of precise drawings in minimizing waste and improving execution efficiency.

10. Learning Outcomes, Teaching, and Assessment Methods

Learning Outcomes (Knowledge and Skills):
By the end of this course, students will be able to:

1. Read and interpret all types of structural drawings and design their components.
2. Understand the behavior of structural materials and their response to internal and external loads.
3. Correctly use technical symbols and scales according to local and international codes.
4. Produce accurate executive designs following ACI-318 and the Iraqi Code.
5. Adhere to ethical and professional standards in preparing and documenting designs.

6. Collaborate and work effectively in groups on structural projects.

Cognitive Objectives:

1. Introduce students to the fundamentals of structural analysis and design.
2. Identify types of structural elements and their functions in a building.
3. Understand the relationship between structural design, calculations, and drawings.
4. Distinguish between types of sections, symbols, and technical terminology in structural drawings.
5. Gain knowledge of structural code requirements for preparing structural drawings.

Skill-based Objectives:

1. Prepare structural designs.
2. Produce reinforcement details for different structural elements professionally.
3. Organize and present drawings on engineering sheets in a clear and systematic way.
4. Apply correct engineering standards in dimensions, annotations, and notes.

11. Teaching and Learning Methods

- Theoretical lectures to explain fundamental concepts.
- In-class exercises and practical workshops.
- Presentations and illustrative models.
- Group work on mini-projects.
- Independent learning through assignments.

12. Assessment Methods

Type of Assessment	Weight (%)	Method
Continuous practical assessment, commitment, and professional conduct	10%	Student performance in practical sessions, assignments, punctuality, accuracy, interaction, and projects
Midterm Exam (First Semester)	20%	Understanding and design questions; analysis of drawings
Midterm Exam (Second Semester)	20%	Understanding and design questions; analysis of drawings
Final Theoretical Exam	50%	Drawing analysis and application of concepts

Reference:

- ACI 318-11: Building Code Requirements for Structural Concrete and Commentary.
- "Design of Concrete Structures" by A.H. Nilson, D. Darwin, C.W. Dolan, 14th Ed.,McGraw-Hill.
- "Design of Reinforced Concrete ACI 318-05 Code Edition." J.C. McCormac and James Nelson, 7th Ed, Wiley.
- "Design of Reinforced Concrete: A Fundamental Approach", by E.G. Nawy, 5th Ed.,Prentice Hall.
- "Reinforced Concrete Fundamentals" by P.H. Ferguson, J.E. Breem, J.O. Jirsa, John Wiley & Sons, New York, 1988.
- "Practical Design of Reinforced Concrete" by Russell S. Fling, John Wiley & Sons.
- "Reinforced Concrete Design" by C.K. Wang, and C.G. Salmon, 6th Ed., Harper Collins.
- "Structural Concrete: Theory and Design" by M.N. Hassoun, Addison Wesley.
- "Reinforced Concrete Slabs" by R. Park and W.L. Gamble, Second Edition, Wiley–Interscience.
- "Reinforced Concrete Design", by Chu-Kia Wang and Charles G. Salmon,
- "Reinforced Concrete Design" 7th edition, Limbrunner & Aghayere.

Course Description: Concrete Technoiogy (1)

1. Educational Institution
Technical Engineering College – Baghdad

2. Department
Building and Construction Engineering Technologies

3. Course Name / Code
Concrete Design 1: BCET302

4. Mode of Attendance
Lecture

5. Academic Year / Semester
2024–2025

6. Total Study Hours
120 hours

7. Date of Preparation
11/05/2024

8. Course Objectives

This course aims to provide students with both theoretical knowledge and practical skills necessary for the design and analysis of structural elements, understanding their structural behavior, and reading structural drawings of various elements in civil engineering projects in line with engineering standards and specifications.

By the end of the course, students are expected to achieve the following:

- Design and analyze various structural elements such as beams, columns, and slabs, and determine their load-bearing capacity.
- Understand the structural and mechanical behavior of essential building elements such as foundations, columns, beams, slabs, walls, and stairs.
- Develop skills in preparing executive designs of reinforced concrete elements, including reinforcement detailing and sectional drawings.
- Use structural symbols, terminology, and measurement systems according to local and international codes (e.g., ACI and Iraqi Code).
- Present structural information in drawings with clarity, accuracy, and ease of execution on-site.
- Connect design calculations with executive drawings to represent design ideas as practical construction drawings.
- Foster professional and ethical commitment through adherence to technical specifications and engineering standards.

9. Affective and Value-based Objectives

The course also aims to instill professional values, attitudes, and behaviors that strengthen students' commitment, teamwork skills, and responsibility in the engineering environment.

At the affective (emotional) level:

- Enhance accuracy and attention to detail in producing structural designs.
- Develop responsibility and discipline in completing tasks within deadlines.
- Foster concern for quality and continuous improvement in technical work.
- Build self-confidence and pride in engineering achievements, individually and collectively.
- Improve flexibility and responsiveness to constructive criticism to enhance design performance.

At the ethical and professional level:

- Uphold scientific and professional integrity in preparing designs according to standards without falsification or negligence.
- Respect intellectual property rights when using or referencing existing designs.
- Promote teamwork and cooperation in collaborative design projects.
- Adhere to engineering safety standards in design and drawing execution.
- Commit to compliance with local and international codes and engineering standards in preparing structural drawings.
- Foster sustainability by recognizing the role of precise drawings in reducing waste and improving efficiency.

10. Learning Outcomes

By the end of the course, students will be able to:

1. Read and interpret all types of structural drawings and design their components.
2. Understand the behavior of construction materials under internal and external loads.
3. Correctly use symbols and scales according to local and international codes.
4. Produce accurate executive designs according to ACI-318 and the Iraqi Code.
5. Adhere to ethical and professional standards in preparing and documenting designs.
6. Collaborate effectively in executing structural projects.

Cognitive Outcomes:

- Understand fundamentals of structural analysis and design.
- Identify structural elements and their functions in a building.
- Comprehend the relationship between design, calculations, and drawings.
- Differentiate between sections, symbols, and technical terminology in structural drawings.
- Acquire knowledge of structural code requirements for preparing drawings.

Skill-based Outcomes:

- Prepare structural designs.

- Produce reinforcement details professionally.
- Organize and arrange drawings systematically within engineering sheets.
- Apply correct engineering standards in dimensions, labels, and annotations.

11. Teaching and Learning Methods

- Theoretical lectures explaining fundamental concepts.
- In-class exercises and practical workshops.
- Presentations and illustrative models.
- Group work on mini-projects.
- Independent learning through assignments.

12. Assessment Methods

Type of Assessment	Weight (%)	Method
Continuous practical assessment, commitment, and professional conduct	10	Student performance in practical sessions, assignments, punctuality, accuracy, interaction, and projects
Midterm Exam (First Semester)	20	Understanding and design questions; analysis of drawings
Midterm Exam (Second Semester)	20	Understanding and design questions; analysis of drawings
Comprehensive exam covering all practical outcomes	10	Final Practical Exam
Final Theoretical Exam	40	Drawing analysis and application of concepts
	100	Total

References:

- A.M. Neville, "Properties of concrete", 3rd. Ed., A Pitman International Text .(١٩٩٨)
- Troxell, Davis, and Kelly, "Composition and properties of concrete", McGraw-Hill book Company (١٩٨٦)
- Iraqi (IS), British (BS), and American (ASTM) Standards for concrete testing .

Course Description: Soil Mechanics

1. Educational Institution
Technical Engineering College – Baghdad

2. Department
Building and Construction Engineering Technologies

3. Course Name / Code
Soil Mechanics / BCET303

4. Mode of Attendance
Theoretical Lectures and Laboratory

5. Academic Year / Semester
2024–2025

6. Total Study Hours
150 hours

7. Date of Preparation
11/05/2024

8. Course Objectives

The *Soil Mechanics* course aims to:

1. Study the physical and mechanical properties of soil, including specific gravity, bulk/dry/saturated density, water content, porosity, compressibility, and shear strength.
2. Study methods for determining soil particle size distribution according to different systems, and soil classification according to international standards.
3. Study soil behavior under self-weight and external loads.
4. Study soil permeability and flow problems.
5. Calculate settlement and its relationship to soil consolidation.

By the end of the course, students are expected to achieve the following:

- **Understand soil behavior:** Describe and classify different soil types and understand their engineering properties based on particle size.
- **Shear strength analysis:** Calculate soil shear strength using different methods depending on soil type and groundwater level.
- **Conduct testing:** Perform all laboratory and field tests, analyze results, and interpret soil investigation reports.
- **Settlement analysis:** Estimate and calculate foundation settlement and ensure it remains within safe limits to prevent structural damage.
- **Soil improvement techniques:** Recognize methods used to improve soil properties for higher bearing capacity and reduced settlement.

- **Site investigations:** Understand the importance and methods of site exploration (test pits, boreholes, field tests) for design data collection.
- **Technical reporting:** Prepare clear technical reports including design calculations and recommendations for foundation systems.

9. Affective and Value-based Objectives

The course does not only provide knowledge of soil properties, equations, and technical skills, but also seeks to build the student's professional character and instill values essential for responsible engineering practice. Designing foundations carries great responsibility for human safety and property, requiring integrity and diligence.

Affective and value-based goals include:

- **Responsibility:** Instill a strong sense of accountability for structural safety and human lives, recognizing the risks of foundation design errors.
- **Accuracy:** Reinforce the importance of precision and attention to detail, from data collection to final calculations.
- **Professional ethics:** Uphold honesty and integrity in engineering practice, rejecting manipulation of specifications or reduced quality standards for profit.
- **Decision-making:** Build confidence in making informed engineering decisions based on scientific and logical principles.
- **Environmental awareness:** Develop sensitivity to environmental impacts of engineering projects, encouraging eco-friendly solutions.
- **Teamwork:** Encourage collaboration with other engineering disciplines, recognizing that project success depends on integrated efforts.
- **Continuous learning:** Foster the motivation to keep up with advances in geotechnical engineering and foundation design.

10. Learning Outcomes

Cognitive Outcomes (Theoretical Understanding):

- Understand soil physical and mechanical properties (gradation, dry/bulk/saturated density, porosity, water content, Atterberg limits).
- Calculate soil stresses and their distribution with depth under self-weight and applied loads.
- Study soil compressibility and shear behavior.

Practical/Skill Outcomes (Laboratory Work):
Perform and interpret the following tests:

1. Water content test
2. Grain size distribution test
3. Specific gravity test
4. Atterberg limits test
5. Unconfined compression test
6. Direct shear test

7. Permeability test

Application in Engineering Practice:

- Conduct preliminary and detailed site investigations.
- Calculate soil bearing capacity for different types of foundations.
- Perform both field and laboratory testing.
- Evaluate soil characteristics for all types of engineering projects.

11. Teaching and Learning Methods

- **Lectures:** Use of presentations and board work to explain theories and equations.
- **Tutorial sessions:** Solving numerical problems and applied examples to reinforce theoretical knowledge.
- **Homework assignments:** Regular design problems to encourage independent practice.
- **Design projects:** Individual or group design projects simulating real-life cases (e.g., foundation design for a small building).
- **Class discussions:** Case studies and problem-solving to promote critical thinking.
- **Blended learning:** Supplementary online materials such as videos, articles, and digital resources.
- **Student presentations:** Oral presentations to enhance communication and technical reporting skills.

12. Assessment Methods

Assessment Type	Weight (%)	Method
Class participation, problem-solving, homework, and commitment	10	Continuous assessment (classwork)
Problems requiring calculation of soil properties, derivation of equations, and soil classification	20	Midterm Exam 1
Problems requiring settlement analysis and shear strength evaluation	20	Midterm Exam 2
Comprehensive exam covering all practical outcomes	10	Final Practical Exam
Comprehensive exam covering all course outcomes, including integrated design problems and case study analysis	40	Final Theoretical Exam
Total	**100**	

References:

- Soil Mechanics (Principles & Practice) / G.E. Barnes.
- Principles of Geotechnical Engineering / B.M. Das.
- Soil Mechanics and Foundation Engineering / B. Singh, S. Prakash.
- Engineering Properties of Soils and their Measurements / J.E. Bowles.
- Soil Testing for Engineers / T.W. Lamb .

Course Description: Engineering Management and Construction Equipment

1. Educational Institution
Technical Engineering College – Baghdad

2. Department
Building and Construction Engineering Technologies

3. Course Name / Code
Engineering Project Management / BCET304

4. Mode of Attendance
Theoretical Lectures, Practical Laboratories, and Workshops

5. Academic Level / Academic Year
Third Year – Academic Year 2024–2025

6. Total Study Hours
60 Hours (30 Theoretical + 30 Practical)

7. Date of Preparation
11/05/2024

8. Course Objectives

This course aims to introduce students to the concepts and principles of modern engineering project management, while developing their abilities in planning, organizing, and controlling projects. It also provides practical skills in using specialized project management software such as *MS Project* for planning and scheduling.

By the end of this course, students are expected to be able to:

- Understand the project life cycle and key management phases.
- Prepare a work plan and time schedule using Gantt Charts.
- Estimate project resources and associated costs.
- Use MS Project for project planning and organization.
- Analyze risks and make administrative decisions based on performance indicators.
- Collaborate effectively within engineering teams in multidisciplinary environments.

9. Course Topics (Syllabus Content)

- Basic concepts of project management
- Project planning
- Time and resource management
- Risk management and quality control
- Leadership and administrative skills

- Practical applications using MS Project

10. Intended Learning Outcomes (ILOs)

a) Knowledge and Understanding

- Understand project management principles and processes.
- Grasp project planning tools, time, and cost estimation.
- Apply concepts of quality and risk management in projects.

b) Intellectual Skills

- Analyze problems and make management decisions.
- Design work breakdown structures and implementation plans.
- Evaluate project performance using key performance indicators (KPIs).

c) Practical Skills

- Prepare a complete project plan using MS Project.
- Manage resources and budgets within project environments.
- Use engineering software for scheduling and time analysis.

d) General Skills

- Work effectively within a team.
- Manage time and prioritize tasks.
- Uphold professional integrity and engineering ethics.

11. Teaching and Learning Methods

- Interactive lectures with real project examples.
- Group and individual exercises in planning and project organization.
- Practical lab sessions using *MS Project*.
- Case study analysis of successful and failed projects.
- Periodic reports and presentations.

12. Assessment Methods

Type of Assessment	Weight (%)	Details
Participation and Assignments	10	Evaluation of professional behavior and short reports
Midterm Exam (Theoretical)	20	Concepts of project management and case study analysis
Practical Project using MS Project	20	Preparation of a complete project plan and schedule

Type of Assessment	Weight (%)	Details
Final Exam (Theoretical + Practical)	50	Project analysis and practical application using MS Project
	100	Total

References:

- Working & tools of builders / G. Barder.
- Construction Planning, Equipment & Methods / R. L. Peurifoy & W. B. Ledbetter.
- Construction Methods and Management / S.W. Nunnally
- Construction Method & Management / S.W. Nunnally
- Project Planning & Control with PERT & CPM / B.C. Punmia & K.K. Khandelnal.
- Construction Planning Equipment & Methods / Peurifoy.
- PMBOK® Guide – 7th Edition, Project Management Institute.
- Project Management, Harold Kerzner.

MS Project

Excel

PowerPoint

Course Description: Structural Theory

1. Educational Institution
Technical Engineering College – Baghdad

2. Department
Building and Construction Engineering Technologies

3. Course Name / Code
Structural Theory / BCET305

4. Mode of Attendance
Theoretical Lecture

5. Academic Year / Semester
Annual / 2024–2025

6. Total Study Hours
75 Hours

7. Date of Preparation
11/05/2024

8. Course Objectives

The *Structural Theory* course aims to:

- **Introduce structural components:** Understand the elements of engineering structures including joints, beams, girders, trusses, and frames, as well as the connections between members, support types, and the effects of applied loads.
- **Differentiate between stable and unstable structures:** Identify unstable structures and methods to stabilize them.
- **Apply concepts of structural analysis:** Analyze structures (statically determinate and indeterminate) using appropriate methods for each type.
- **Use the method of sections in analysis.**
- **Draw elastic deformation shapes, shear force diagrams, and bending moment diagrams:** Identify zones of tension and compression in reinforcement and determine transition points in both determinate and indeterminate structures.
- **Understand influence lines:** Analyze the effect of loads using influence lines and apply them in structural analysis.
- **Develop self-learning skills:** Acquire knowledge of modern analysis methods and learn to use specialized structural analysis software.

9. Learning Outcomes, Teaching, and Assessment Methods

By the end of this course, students will be able to:

- Understand the principles of structural representation and application of loads.

- Differentiate and classify structural elements (stable, unstable, statically determinate, statically indeterminate).
- Draw and interpret shear force diagrams, bending moment diagrams, and elastic deformation shapes for both determinate and indeterminate structures.
- Analyze structures (determinate and indeterminate) and calculate critical reinforcement locations.
- Apply simplified/rapid methods of structural analysis.

10. Teaching and Learning Methods

- Theoretical lectures to explain fundamental concepts of structural analysis.
- Group discussions to explore ideas and problem-solving methods.
- Independent learning through homework assignments.
- In-class evaluations (daily and monthly quizzes/exams).

11. Assessment Methods

Type of Assessment	Weight (%)	Method
Continuous assessment, commitment, and professional conduct	10	Student performance in theoretical classes, assignments, daily quizzes, punctuality, accuracy, and participation
Midterm Exam (First Semester)	20	Identification and analysis of structural members (reactions, applied loads) and drawing influence lines for statically determinate beams
Midterm Exam (Second Semester)	20	Analysis of statically indeterminate structures using various methods
Final Theoretical Exam	50	Differentiation and analysis of determinate and indeterminate structures
	100	Total

Reference

- Elementary theory of structures / Yuan Y. Hsieh.
- Structural analysis / Russell C. Hibbeler.
- Structural and Stress Analysis / T.H.G. Megson.
- Fundamentals of structural analysis/ Kenneth M. Leet, Chia Ming Hang and Anne M. Giberl.

Course Description: Engineering Analysis (Advanced Mathematics)

1. Educational Institution
Technical Engineering College – Baghdad

2. Department
Building and Construction Engineering Technologies

3. Course Name / Code
Advanced Mathematics / BCET306

4. Mode of Attendance
Lecture

5. Academic Year / Semester
2024–2025

6. Total Study Hours
120 Hours

7. Date of Preparation
11/05/2024

8. Course Objectives

This course aims to provide students with advanced theoretical knowledge and analytical skills in mathematics, enabling them to model, analyze, and solve complex engineering problems. The course emphasizes applying mathematical techniques to real-world scenarios in civil and transportation engineering while enhancing analytical thinking and problem-solving abilities.

By the end of the course, students are expected to:

- Apply advanced mathematical concepts to analyze and solve engineering and scientific problems.
- Demonstrate proficiency in using mathematical modeling methods in practical applications.
- Continue developing mathematical knowledge to adapt to modern technologies and research developments.
- Work effectively in teams, showing critical thinking, accuracy, and adherence to professional ethics in all mathematical tasks.

9. Affective and Value-based Objectives

Affective Objectives:

- Develop appreciation for mathematics as a foundation for engineering, technology, and scientific progress.
- Foster responsibility towards accuracy and reliability in applying mathematics to engineering problems.
- Value logical thinking, precision, and ethical principles in mathematical modeling and problem-solving.
- Cultivate a desire for lifelong learning and adaptation to emerging theories and tools.
- Learn to communicate mathematical concepts effectively, present analyses clearly, and collaborate in problem-solving teams.
- Build initiative and decision-making ability to apply advanced mathematics for innovative and sustainable solutions.
- Recognize the interdisciplinary connections of mathematics with engineering design, computer science, and data-driven decision-making.

Ethical and Professional Values:

- Commitment to academic honesty and integrity in all mathematical calculations, analyses, and research.
- Respect intellectual property by proper citation of sources, theories, and computational tools.
- Encourage teamwork, effective communication, and collaboration in solving advanced problems.
- Maintain accuracy and reliability when applying mathematical models to engineering solutions.
- Adhere to international standards and best practices in documenting mathematical processes and computational ethics.
- Promote responsible use of mathematics to improve efficiency, reduce errors, and support community development.

10. Learning Outcomes

General Outcomes:

- Develop critical thinking, inference, and evaluation skills.
- Improve analytical reasoning and observation.
- Enhance conceptual understanding of mathematical theories and general principles.
- Link mathematical learning to future planning and real-life applications.
- Practice diverse approaches to mathematical proofs.
- Foster independence in problem-solving and scientific exploration.
- Understand statistical concepts and their applications in civil engineering.
- Apply analytical methods to solve practical problems.
- Identify operational problems in civil engineering studies and evaluate alternative solutions.

Cognitive Outcomes (Knowledge):

- Understand advanced concepts in calculus, differential equations, linear algebra, and numerical methods.

- Identify suitable mathematical models for analyzing engineering and scientific problems.
- Relate mathematical theories and techniques to real-world engineering applications.
- Differentiate between solution methods and evaluate their accuracy and efficiency.
- Recognize the role of mathematics in modern computational tools and international engineering practices.

Psychomotor Outcomes (Skills):

- Solve complex mathematical problems using analytical and numerical methods with precision.
- Use advanced mathematical software (e.g., MATLAB, Mathematica) for modeling and analyzing engineering systems.
- Organize and present mathematical solutions systematically, including clear documentation of steps and results.
- Apply mathematical standards, conventions, and visualization techniques in interpreting results.

11. Teaching and Learning Methods

- Theoretical lectures to explain core concepts.
- In-class exercises and practical workshops.
- Independent learning through assignments and homework.

12. Assessment Methods

Type of Assessment	Weight (%)	Method
Class participation, assignments, and attendance	10	Active participation, problem-solving, homework, and presence
First Midterm Exam	20	Comprehensive exam covering all outcomes of the first semester
Second Midterm Exam	20	Comprehensive exam covering all outcomes of the second semester
Final Theoretical Exam	50	Comprehensive exam covering all course outcomes
	100	

References:

- Advanced engineering mathematics / Erwin kreyszig.
- Applied mathematics for engineering & physicists / pipes & Harvill.
- Numerical methods for engineers / S.C. Chapra & R. P. Canale.

Course Description: Highway Engineering

1. Educational Institution
Technical Engineering College – Baghdad

2. Department
Building and Construction Engineering Technologies

3. Course Name / Code
Highway Engineering / BCET307

4. Mode of Attendance
Lecture

5. Academic Year / Semester
2024–2025

6. Total Study Hours
60 Hours

7. Date of Preparation
11/05/2024

8. Course Objectives

This course aims to provide students with the theoretical foundations and practical skills necessary for the planning, design, and evaluation of transportation systems in accordance with recognized engineering standards and specifications. The focus is on understanding the principles of highway engineering, traffic flow, and transportation systems to meet safety, efficiency, and sustainability requirements.

Expected Learning Contributions:

1. Contribute to the development of safe, efficient, and environmentally sustainable transport infrastructure.
2. Demonstrate proficiency in transportation engineering to analyze and solve traffic and community challenges.
3. Commit to continuous learning to keep pace with modern technologies and evolving practices.
4. Work effectively in teams, showing leadership and professional ethics in project implementation.

9. Affective and Value-based Objectives

Affective Goals:

- Develop awareness of the impact of transportation systems on communities, economies, and the environment.
- Prioritize safety in transportation design and operation while adhering to ethical principles.
- Encourage continuous learning and adaptability to technological advancements in transportation.
- Enhance communication skills and effective teamwork in multidisciplinary project environments.
- Build initiative and informed decision-making to lead sustainable and socially beneficial transportation projects.
- Understand the interconnection of transportation with urban planning, economic growth, and social equity.

Ethical and Professional Values:

1. Commitment to academic integrity and professional honesty in design and evaluation of transportation systems.
2. Respect for intellectual property rights in the use of data, software, and design methodologies.
3. Promote teamwork, collaboration, and effective communication in multidisciplinary transport planning.
4. Prioritize safety standards in design, construction, and operation of transportation infrastructure.
5. Adhere to local and international codes, technical standards, and best practices.
6. Enhance sustainability by designing transport systems that reduce environmental impact, improve energy efficiency, and enhance community well-being.

10. Learning Outcomes

By the end of the course, students should be able to:

1. Apply knowledge of horizontal and vertical curve design in road planning.
2. Determine sight distances for different curve types.
3. Understand flexible and rigid pavement design methods.
4. Interpret traffic parameters such as AADT, ADT, and DHV.
5. Classify subgrade soils using AASHTO and USCS systems.
6. Evaluate asphalt mix specifications to ensure quality.
7. Select suitable materials for road layers.
8. Assess the performance of bound and unbound pavement materials.
9. Design and analyze road pavements, classify slippage failures, and propose corrective methods.
10. Analyze and design soil-retaining structures to ensure stability.
11. Identify slope and retaining wall failures in real projects and suggest corrective and preventive measures.

Cognitive Outcomes:

- Understand fundamentals of road planning, design, and construction.
- Identify components of road systems, including pavement layers, subgrade, and drainage structures.
- Relate traffic studies, design principles, and material properties to road performance and design.
- Distinguish between pavement types, design methods, and construction techniques.
- Understand requirements of national and international road design standards.

Skill Outcomes:

- Conduct field surveys and collect accurate road alignment data.
- Analyze pavement layers and prepare professional design drawings.
- Organize project documentation, including plans, profiles, and cross-sections, systematically.
- Apply engineering standards in scales, labeling, and annotations of road design drawings.

11. Teaching and Learning Methods

- Theoretical lectures to explain fundamental concepts.
- Classroom exercises and practical workshops.
- Independent learning through homework and assignments.

12. Assessment Methods

Type of Assessment	Weight (%)	Method
Laboratory performance, assignments, discipline, and project interaction	10	Class participation, problem-solving, homework, and attendance
First Midterm Exam	20	Short analytical and design problems covering the first half of the course
Second Midterm Exam	20	Design problems applying road geometric design principles
Final Exam	50	Comprehensive exam covering all course outcomes
	100	Total

References:

- Road design manual / 2007.
- A Policy on geometric design of highway and streets / 2001.
- The handbook of highway engineering / 2006.
- Super pave fundamentals, FHWA, NHI # 131053.
- Internet's references.

Course Description: Computer 2

1. Educational Institution
Technical Engineering College – Baghdad

2. Department
Building and Construction Engineering Technologies

3. Course Name / Code
Computer 2 / BCET308

4. Mode of Attendance
Theoretical Lecture, Laboratory, and E-learning

5. Academic Year / Semester
2024–2025

6. Total Study Hours
90 Hours

7. Date of Preparation
١١/٥/2024

8. Course Objectives

This course aims to provide students with theoretical knowledge and practical skills in applying computer software, focusing on **ETABS** for structural engineering design/analysis and **Primavera** for engineering project management. Both applications will be introduced through theoretical review and practical implementation.

Specific Objectives:

1. Understand the general concepts, terminology, and user interfaces of both ETABS and Primavera applications.
2. Develop student skills in data input, using practical examples, and interpreting the results.
3. Enable students to connect results with modern theories and theoretical aspects from other engineering subjects.
4. Prepare students for advanced stages of study where more complex applications will be introduced.
5. Link practical application with theory through diverse examples.

9. Affective and Value-based Objectives

The course also seeks to strengthen student attitudes and values by:

1. Enhancing understanding of the basic steps and the importance of sequence and interconnection between stages.
2. Promoting responsibility and academic integrity by emphasizing the delivery of accurate and reliable knowledge from trusted scientific and practical sources.
3. Building self-confidence through teamwork, communication, and consultation.

10. Learning Outcomes

By the end of the course, students will be able to:

1. Distinguish between **design and analysis functions in ETABS** (for structural design and analysis) and **critical path method (CPM) scheduling in Primavera** (for project management).
2. Apply modern software applications to save time, achieve reliable results, and keep pace with new versions.
3. Use advanced computer concepts to expand their understanding of project management and structural analysis/design.

11. Teaching and Learning Methods

- Theoretical lectures to explain fundamental concepts.
- Classroom exercises.
- Homework and assignments.

12. Assessment Methods

Type of Assessment	Weight (%)	Method
Continuous practical assessment, commitment, and professional conduct	30	Student performance in practical sessions, assignments, and attendance
Midterm Exam (First Semester)	10	Understanding, design, analysis, data input, and interpretation of results (ETABS)
Midterm Exam (Second Semester)	10	Understanding, design, analysis, data input, and interpretation of results (Primavera)
Final Practical Exam	10	Student performance in applying engineering software tools
Final Theoretical Exam	40	Drawing analysis and project plan interpretation using software outputs
	100	Total

- تخطيط المشاريع باستخدام البرنامج بريمافيرا , ترجمة الدكتور المهدس ابراهيم الحكيم , شعاع للنشر والعلوم سورية – حلب ٢٠٠٢
- Project Planning & Scheduling Using Primavera® P6, By Paul Eastwood Harris, http://www.damasgate.com/vb/t144508 /
- دارة المشروعات باستخدام برنامج (بريمافيرا انتربرايز)Primavera Enterprise المهندس خالد عبد العال
- James, K. Nelson, JR. 1998. User Manual, Version 1.52, Addison Wesley Longman, USA.
- Nilson, Arthur H. et al. 2004, Design of Concrete Structures, 14th edition, Chapter I9, McGraw-Hill Companies Inc., New York.

Course Description: Systematic Training

1. Educational Institution
Technical Engineering College – Baghdad

2. Department
Building and Construction Engineering Technologies

3. Course Name / Code
Systematic Training / BCET309

4. Mode of Attendance
Field-based training at construction/work sites

5. Academic Year / Semester
2024–2025 (during the summer vacation)

6. Total Training Hours
4 weeks – 6 working days per week (equivalent to 120 training hours)

7. Date of Preparation
١١/٥/2024

8. Course Objectives

This course aims to provide students with **practical experience** through direct exposure to real engineering work environments. Upon completion, students are expected to achieve the following:

1. Strengthen the ability to integrate theoretical knowledge gained in classrooms with practical applications in engineering sites.
2. Develop observation and analytical skills for professional practices in construction and building projects.
3. Train students to use engineering tools, equipment, and software applied in the workplace.
4. Enhance communication and coordination skills with technical and engineering staff.
5. Reinforce commitment to occupational safety standards during fieldwork.
6. Instill values of discipline and responsibility in carrying out practical tasks.

Course Description: Technical English (3)

1. Educational Institution
Technical Engineering College – Baghdad

2. Department
Building and Construction Engineering Technologies

3. Course Name / Code
Technical English / BCET310

4. Mode of Attendance
Theoretical Lectures

5. Academic Year / Semester
2024–2025

6. Total Study Hours
64 Hours

7. Date of Preparation
١١/٥/2024

8. Course Objectives

The *Technical English* course aims to equip fourth-year students in the Department of Construction and Building Engineering with advanced language skills necessary to succeed in the global engineering workplace.

The course covers reading and understanding complex technical texts (e.g., specifications, project reports, scientific papers), developing professional writing skills (CVs, professional emails, technical reports), improving oral communication, and building a specialized engineering vocabulary.

By the end of this course, students should be able to:

1. Understand and analyze technical documents such as manuals and specifications.
2. Write clear and well-structured technical reports (e.g., progress reports, inspection reports).
3. Compose professional correspondence including formal emails.
4. Prepare CVs and cover letters tailored for engineering careers.
5. Build a broad vocabulary of specialized engineering terms.
6. Prepare and deliver effective technical presentations.
7. Participate confidently in technical meetings and discussions.
8. Improve listening comprehension of lectures, webinars, and technical discussions.
9. Read and understand contracts and tender documents.
10. Conduct academic research in English and cite sources properly.
11. Communicate effectively across cultures in international engineering environments.

12. Use English for critical thinking and problem-solving in technical contexts.

9. Affective and Value-based Objectives

- **Building Self-Confidence:** Develop confidence in using English in real professional contexts such as meetings and technical writing.
- **Appreciating the Importance of English:** Recognize English as a tool for professional growth, access to global knowledge, and career advancement.
- **Fostering Motivation for Lifelong Learning:** Encourage continuous self-development through reading technical articles and attending international seminars.
- **Positive Attitude Towards Communication:** Shift from hesitation to confidence in using English for technical discussions.
- **Respecting Cultural Diversity:** Learn to communicate respectfully in multicultural engineering environments.
- **Commitment to Accuracy and Professionalism:** Apply precision in using technical terms and professionalism in correspondence.
- **Encouraging Initiative:** Take initiative in researching, asking questions, and engaging in discussions in English.
- **Enjoying the Use of Language:** Find satisfaction in successfully understanding and expressing complex technical ideas in English.

10. Learning Outcomes

Knowledge Outcomes:

- Recognize a wide range of specialized terms in construction and building engineering.
- Understand the structure and types of engineering documents (reports, specifications, professional emails).
- Comprehend the fundamentals of academic and professional writing in English.

Skill Outcomes:

- Write clear and concise technical reports and professional correspondence.
- Deliver effective oral presentations on technical topics.
- Read and analyze complex engineering texts and extract key information.
- Participate in technical discussions and meetings in English.

Affective Outcomes:

- Demonstrate confidence in professional English communication.
- Appreciate the importance of English for engineering success.
- Commit to accuracy and professionalism in written and spoken English.

11. Teaching and Learning Methods

Instructor Methods:

- **Interactive Lectures** – introducing core concepts and technical vocabulary with active student participation.
- **Task-Based Learning** – assignments simulating workplace tasks (e.g., writing technical emails, summarizing reports).
- **Case Studies** – analyzing real engineering projects and related documents.
- **Blended Learning** – combining traditional lectures with online resources (videos, articles, interactive tools).
- **Workshops** – focused sessions on CV writing, technical presentations, etc.
- **Multimedia Use** – video materials of engineering meetings, interviews, and documentaries to enhance listening skills.

Student Methods:

- **Collaborative Learning** – small group projects (e.g., preparing a technical presentation or joint report).
- **Role-Playing/Simulation** – simulating professional contexts (e.g., job interviews, contractor negotiations).
- **Guided Self-Study** – reading assigned engineering articles and reviewing webinars.
- **Presentations** – individual or group presentations on technical topics.
- **Peer Review** – reviewing classmates' work (reports, CVs) and giving constructive feedback.

12. Assessment Methods

Type of Assessment	Weight (%)	Method
Class participation, short presentations, assignments, and applied project (e.g., report or CV with presentation)	10	Continuous Assessment
Midterm Exam 1	20	Focus on technical terms, reading comprehension, and professional correspondence
Midterm Exam 2	20	Similar scope to Midterm 1 with new topics
Final Exam	50	Comprehensive exam covering all skills (reading, writing, listening, case study analysis)
Total	**100**	

References:

https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering

- https://link.springer.com/book/10.1007/978-981-10-8624-3

- https://progressivecollege.ie/courses/early-learning-and-care-qqi-level-5-major-award/?gad=1&gclid=EAIaIQobChMI_Nqu2tqA_wIVZ4VoCR2O0woLEAAYASAAEgI9WvD_BwE

Course Description: Reinforced Concrete Structures Design (2)

1. Educational Institution
Technical Engineering College – Baghdad

2. Department
Building and Construction Engineering Technologies

3. Course Name / Code
Reinforced Concrete Structures Design (2) / BCET401

4. Mode of Attendance
Theoretical Lectures, Practical Laboratories, and Workshops

5. Academic Level / Academic Year
Fourth Year – Academic Year 2024–2025

6. Total Study Hours
90 Hours (60 Theoretical + 30 Practical)

7. Date of Preparation
١١/٥/2024

8. Course Objectives

This course aims to enable students to analyze and design **advanced structural elements** in reinforced concrete structures using recognized engineering codes, applying theoretical concepts through structural analysis and executive design.

By the end of the course, students are expected to:

- Understand the behavior of reinforced concrete elements under various loads (static, seismic, instantaneous).
- Design one-way and two-way slabs according to ACI 318 requirements.
- Analyze and design slender columns, considering slenderness effects using moment magnifier methods.
- Apply the **Strut-and-Tie** model for disturbed regions (D-regions) and non-typical areas.
- Analyze and design **beam–column joints** according to seismic resistance requirements and modern codes.
- Recognize different **structural systems** in concrete buildings (slab systems, load-bearing walls, shear walls).
- Apply seismic design principles and understand requirements for earthquake-resistant construction.
- Analyze and design **prestressed concrete members** using elasticity principles and stress loss concepts.

9. Course Topics (Contents)

Slab Design

- Types: one-way, two-way, and continuous slabs.
- Direct design method and Equivalent Frame method.
- Depth restrictions, openings, shrinkage, and temperature reinforcement.

Slender Columns

- Axial loading, combined loading (compression + bending).
- Structural behavior of sway vs. non-sway frames.
- Use of moment magnifier method and second-order analysis.

Strut-and-Tie Models (STM)

- Principles and theoretical background.
- Applications in corners, concentrated load regions, and complex joints.

Joint Design (Beam–Column Connections)

- Beam–column joint analysis.
- Simplified models for force distribution in joints.
- Reinforcement detailing for structural integrity.

Concrete Structural Systems

- Floor and slab systems, load-bearing walls, curtain walls, shear walls.
- Shear wall design according to shear and lateral buckling requirements.

Seismic Design

- Structural behavior under seismic loads.
- ACI and IBC requirements for earthquake-resistant design.
- Distribution of longitudinal and transverse reinforcement in seismic elements.

Prestressed Concrete

- General principles and stressing techniques.
- Elastic analysis, bending, and stress limits.
- Cable profiles, stress losses, shear and diagonal tension design.

10. Intended Learning Outcomes (ILOs)

Knowledge and Understanding

- Understand principles of advanced reinforced concrete design.
- Comprehend the impact of lateral and seismic loads on behavior of structural elements.
- Apply modern design codes (ACI 318, IBC).

Intellectual Skills

- Analyze behavior of structural members under various forces.
- Select appropriate design methods based on structural type and loading.
- Interpret and evaluate structural drawings.

Practical Skills

- Prepare detailed structural designs according to codes.
- Use engineering software (SAP2000, ETABS, AutoCAD) for analysis and drawing.
- Solve advanced design problems including joints, shear zones, and combined stress elements.

General Skills

- Work in teams to complete design projects.
- Manage time and meet deadlines in delivering projects.
- Commit to academic honesty and professional integrity in structural design.

11. Teaching and Learning Methods

- Interactive lectures with real-life examples.
- Manual design exercises and laboratory work with software tools.
- Workshops on advanced design problems.
- Case studies of real structural projects.
- Individual and group design reports.

12. Assessment Methods

Type of Assessment	Weight (%)	Details
Participation, assignments, and practical projects	10%	Practical performance, professional behavior, project work
Midterm Exam 1	20%	Structural analysis and design of simple elements
Midterm Exam 2	20%	Application of advanced design concepts
Final Exam (Theoretical + Practical)	50%	Structural analysis, integrated design, and code interpretation

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13. References

Primary References:

- ACI 318-11: Building Code Requirements for Structural Concrete and Commentary.
- "Design of Concrete Structures" by A.H. Nilson, D. Darwin, C.W. Dolan, 14th Ed., McGraw-Hill.
- "Design of Reinforced Concrete ACI 318-05 Code Edition." J.C. McCormac and James Nelson, 7th Ed, Wiley.
- "Design of Reinforced Concrete: A Fundamental Approach", by E.G. Nawy, 5th Ed., Prentice Hall.
- "Reinforced Concrete Fundamentals" by P.H. Ferguson, J.E. Breem, J.O. Jirsa, John Wiley & Sons, New York, 1988.
- "Practical Design of Reinforced Concrete" by Russell S. Fling, John Wiley & Sons.
- "Reinforced Concrete Design" by C.K. Wang, and C.G. Salmon, 6th Ed., Harper Collins.
- "Structural Concrete: Theory and Design" by M.N. Hassoun, Addison Wesley.
- “Reinforced Concrete Slabs” by R. Park and W.L. Gamble, Second Edition, Wiley–Inter science.
- "Reinforced Concrete Design", by Chu-Kia Wang and Charles G. Salmon
- “Reinforced Concrete Design” 7th edition, Limbrunner & Aghayere.
- ACI 318M–19: Building Code Requirements for Structural Concrete
- Nilson, Darwin & Dolan, "Design of Concrete Structures"
- PCA Notes on ACI 318

دليل الكود العراقي للخرسانة المسلحة

ثانيًا: البرمجيات الهندسية: Excel، AutoCAD، SAFE، ETABS، SAP2000

Course Description: Building Foundation Engineering Technologies

1. Educational Institution
Technical Engineering College – Baghdad

2. Department
Building and Construction Engineering Technologies

3. Course Name / Code
Foundation Engineering Technologies / BCET402

4. Mode of Attendance
Theoretical Lectures

5. Academic Year / Semester
2024–2025

6. Total Study Hours
160 Hours

7. Date of Preparation
١١/0٥/2024

8. Course Objectives

The course *Building Foundation Engineering Technologies* aims to provide students with the knowledge and understanding required to design and construct building foundations safely and economically.

Students will learn to:

- Analyze soil properties and determine its load-bearing capacity.
- Understand and design different types of foundations (shallow and deep).
- Evaluate expected settlement and prevent stability problems.
- Apply soil improvement techniques and field investigation methods.
- Develop skills in using software tools for foundation design.
- Prepare technical reports including design calculations and recommendations.

By the end of the course, students are expected to:

- **Understand soil behavior**: describe and classify soils and their engineering properties.
- **Analyze soil stresses**: compute vertical stresses induced by structural loads.
- **Determine bearing capacity**: calculate the safe bearing capacity of shallow foundations.

- **Design shallow foundations**: isolated, strip, and combined footings safely and economically.
- **Evaluate settlement**: estimate and check foundation settlement against allowable limits.
- **Design deep foundations**: understand pile applications and design piles for load transfer.
- **Select suitable foundation types**: based on soil conditions and project requirements.
- **Design retaining walls**: analyze and design for soil stability and earth pressure.
- **Apply soil improvement methods**: study techniques to increase soil strength and reduce settlement.
- **Conduct site investigations**: understand boreholes, field tests, and soil sampling.
- **Use computer programs**: gain introductory skills with *Plaxis 2D/3D* and *SAFE*.
- **Prepare technical reports**: integrate calculations, drawings, and recommendations.

9. Affective and Value-based Objectives

This course emphasizes not only technical skills but also professional responsibility and ethical practice:

- **Responsibility:** Recognize the critical importance of safe foundation design to protect lives and property.
- **Accuracy:** Value precision and avoid neglecting details from soil testing to final calculations.
- **Professional Ethics:** Commit to honesty and integrity in engineering practice, avoiding manipulation of specifications.
- **Decision-making:** Build confidence in selecting design solutions based on scientific evidence.
- **Environmental Awareness:** Appreciate the impact of foundations on the environment and promote sustainable solutions.
- **Teamwork:** Develop cooperation and collaboration with multidisciplinary engineering teams.
- **Continuous Learning:** Encourage keeping up with advances in geotechnical and foundation engineering.

10. Intended Learning Outcomes (ILOs)

Knowledge & Understanding

- Explain soil classification, engineering properties, and behavior.
- Define theories for bearing capacity and settlement of shallow and deep foundations.
- List and describe types of foundations and retaining structures.
- Recognize importance of soil investigation and ground improvement techniques.

Intellectual Skills

- Analyze structural loads and their stresses on soils.
- Evaluate soil test results for proper foundation choice.
- Compare alternative design solutions technically and economically.

- Interpret manual or software-generated results and judge validity.

Practical & Professional Skills

- Design dimensions and reinforcement of shallow foundations.
- Perform design calculations for pile foundations.
- Use specialized software (Plaxis, SAFE) for foundation analysis and design.
- Prepare comprehensive technical design reports with drawings and recommendations.

General & Transferable Skills

- Apply scientific principles to solve complex real-world foundation problems.
- Work effectively within a team on design projects.
- Demonstrate professional ethics and responsibility for safety.
- Communicate engineering solutions clearly in reports and presentations.

11. Teaching and Learning Methods

- **Lectures** using presentations and boardwork to explain fundamental principles.
- **Tutorials** for problem-solving and applied exercises.
- **Homework assignments** to reinforce independent study.
- **Design projects** (individual/group) simulating real foundation problems.
- **Class discussions** for critical thinking and case studies.
- **Software training workshops** (*Plaxis 2D/3D, SAFE*).
- **Blended learning** using online resources and recorded materials.
- **Field visits (if possible)** to observe soil testing and foundation construction.
- **Student presentations** on project results and research topics.

12. Assessment Methods

Type of Assessment	Weight (%)	Method
Continuous Assessment	10	Class participation, assignments, and attendance
Midterm Exam 1	20	Analytical and short design problems (bearing capacity, stresses)
Midterm Exam 2	20	Design problems (settlement, deep foundations)
Final Exam	50	Comprehensive exam covering all outcomes, including design and case study analysis
Total	**100**	

References:

- Principles of Foundation Engineering, Fifth Edition, By Braja-M. Dass, California University 2006.

- Foundation Analysis & Design / Bowles.

Course Description – Steel Structures Design

1. Educational Institution:
Engineering Technical College – Baghdad

2. Academic Department:
Building and Construction Engineering Technologies

3. Course Title/Code:
Steel Structures Design / BCET403

4. Modes of Attendance:
Lectures (theoretical) and Applied Laboratories

5. Academic Year / Semester:
Fourth Year – Academic Year 2024–2025

6. Total Credit Hours:
90 hours (60 theoretical + 30 practical)

7. Date of Description Preparation:
١١ /0٥/2024

8. Course Objectives

This course aims to enable students to analyze and design steel structures in accordance with internationally recognized standards, applying theoretical concepts through structural analysis and practical design. Upon successful completion, students are expected to:

- Study the properties and types of steel sections used in structural analysis and design.
- Understand engineering standards for steel structures and load determination (vertical and lateral loads such as wind and earthquake), including load combinations.
- Analyze and design **tensile members**.
- Analyze and design **compression members**.
- Analyze and design **steel beams** for shear and bending moment.
- Analyze and design **plate girders**.
- Analyze and design **steel connections** (bolted and welded) and base plates.
- Complete integrated building design projects using software such as **STAAD.Pro** and **ETABS**.

Course Topics

1. **Steel Sections and Properties**
    - Stress–strain curve of steel
    - Grades and classifications of structural steel

    - Standard steel sections (I-beams, channels, angles, etc.) according to global standards
2. **Design Codes and Standards**
    - AISC Steel Construction Manual
    - ASCE 10-16 Load Specification
    - Comparison with other international codes
3. **Design of Tensile Members**
    - Stress calculations on gross, net, and effective areas
    - ASD & LRFD design methods
    - Practical applications of tensile members
4. **Design of Compression Members**
    - Buckling factor (for isolated and framed columns)
    - Euler's buckling equation
    - Applications using analytical equations and design tables
5. **Design of Steel Beams**
    - Theoretical basis and AISC provisions
    - Beam design for flexure, shear, and torsion
    - Advanced applications and case studies
6. **Plate Girders**
    - Design principles
    - Stiffeners (longitudinal & transverse)
    - Load distribution and detailing
7. **Connections**
    - Rigid, semi-rigid, and flexible joints
    - Bolted and welded connections
    - Design and detailing of base plates
8. **Design Projects**
    - Complete structural design of steel buildings
    - Applications using **STAAD.Pro, ETABS, and AutoCAD**

Intended Learning Outcomes (ILOs)

a) Knowledge & Understanding

- Understand principles of steel member design.
- Apply vertical and lateral loads (wind, earthquake) to steel structures.
- Implement requirements of AISC and ASCE standards.

b) Intellectual Skills

- Analyze structural behavior under different loading conditions.
- Select appropriate design methods depending on the structural element.
- Interpret and evaluate structural drawings.

c) Practical & Professional Skills

- Prepare detailed designs using codes and standards.
- Use specialized software (SAP2000, ETABS, AutoCAD) for analysis and detailing.

- Solve advanced design problems (connections, combined stresses, shear regions).

d) General & Transferable Skills

- Work effectively in design teams.
- Manage time and deliver projects on schedule.
- Demonstrate professional ethics and integrity in engineering practice.

11. Teaching and Learning Methods

- Interactive lectures with practical examples.
- Manual design labs and software-based analysis.
- Problem-solving workshops and practical applications.
- Case studies of real-world projects.
- Individual and group design reports.

12. Assessment Methods

Type of Assessment	Weight (%)	Details
Class participation, homework, and projects	10	Practical performance, professional conduct, and assignments
Midterm Exam 1	20	Structural analysis and design of simple members
Midterm Exam 2	20	Application of advanced design concepts
Final Exam (theory + practical)	50	Comprehensive design project, analysis, and code interpretation
Total	**100**	Total

13. References

Primary Textbooks & Codes:

- "Steel Design" by William T. Segui
- "Design of Steel Structures" by Edwin H. Gaylord, Charles N. Gaylord, and James Stallmeyer
- "Structural Steel Design" by Jack C. McCormac and Stephen F. Csernak
- "Design of Steel Structures" by Ramchandra and Virendra Gehlot
- AISC Steel Construction Manual
- Applied Structural Steel Design, L. Spiegel & G.E. Limbrunner, 4th ed., Prentice Hall, 2002 .

- Manual of steel construction, 13th ed., American Institute of Steel Construction, 2005.
- Structural Steel Designer's Handbook, R. L. Brockenbrough, F. S. Merritt, 3rd ed., McGraw-Hill, 1994.
- Building Design and Construction Handbook; Frederick S. Merritt (Deceased) Jonathan T. Ricketts, Sixth Edition, McGRAW-HILL.

Course Description: Estimation, Specifications, and Contracts

1. Educational Institution:
Technical Engineering College – Baghdad

2. Academic Department:
Construction and Building Engineering Technology

3. Course Title / Code:
Estimation, Specifications, and Contracts / BCET404

4. Modes of Attendance:
Lectures and Project

5. Semester / Academic Year:
2024–2025

6. Total Contact Hours:
120 hours

7. Date of Description Preparation:
١١/٥/2024

8. Course Objectives

This course aims to provide students with advanced theoretical knowledge and analytical skills in estimating construction materials, enabling them to analyze and solve engineering problems related to estimation in civil engineering projects.

The importance of this course lies in applying various techniques to real-world scenarios in civil engineering, enhancing students' capabilities to solve on-site construction problems.

By the end of the course, students are expected to be able to:

1. Solve and analyze advanced engineering and scientific problems.
2. Develop material estimation skills using different techniques for practical applications.
3. Understand contracts related to engineering projects.
4. Prepare contracts for various types of projects.
5. Understand specifications related to construction materials.

9. Affective and Value Objectives

A. Affective Objectives:

1. Develop an understanding of the crucial role of estimation and contracts in project preparation, and strengthen responsibility towards accuracy and reliability.

2. Foster a sense of logical problem-solving, precision, and ethical considerations in contracts and estimation.
3. Encourage continuous updating of engineering knowledge and staying current with professional advancements.
4. Acquire the ability to communicate effectively with engineers and contractors, explain technical analyses, and collaborate efficiently in problem-solving teams.
5. Stimulate creativity, sound decision-making, and the adoption of innovative and sustainable solutions.
6. Recognize the interconnection between estimation and other fields such as engineering design, computer applications, and site supervision.

B. Ethical and Professional Values:

1. Uphold academic integrity and honesty in all estimation calculations and analyses.
2. Respect intellectual property through proper citation of references, theses, and research papers.
3. Promote teamwork and partnership in solving engineering problems.
4. Maintain accuracy and reliability in applying calculations and records to engineering solutions.
5. Commit to international standards, continuous practice, and professional development.
6. Encourage the responsible and sustainable use of materials to improve efficiency, reduce pollution, and support the advancement of construction engineering.

10. Learning Outcomes

A. Knowledge and Understanding

- Comprehend advanced concepts in estimation, specifications, and contracts.
- Classify appropriate methods for solving engineering and scientific problems.
- Relate academic study and techniques to real-world civil engineering applications.
- Distinguish between different problem-solving methodologies and evaluate their efficiency.
- Recognize the role of estimation in project development and international engineering practices.

B. Intellectual Skills

- Develop critical thinking and analytical problem-solving skills.
- Conduct statistical calculations and apply them in civil engineering.
- Plan for future applications by linking theoretical knowledge with daily practice.

C. Practical Skills

- Prepare contracts, estimate material quantities, and evaluate project costs accurately.
- Apply advanced estimation methods and standard specifications.
- Present organized solutions and calculations with clear documentation.
- Apply international standards and specifications in testing construction materials.

D. General Skills

- Work effectively in teams to prepare contracts and cost estimates.
- Manage time and meet project deadlines.
- Rely on self-learning and independent problem-solving.
- Communicate technical results effectively with stakeholders.

11. Teaching and Learning Methods

1. Project preparation covering all fundamentals learned in the course.
2. Theoretical lectures to explain core concepts.
3. Classroom exercises and practical workshops.
4. Homework assignments and case studies.

12. Assessment Methods

Assessment Type	Weight (%)	Description
Class participation, assignments, attendance	10	Active participation, exercises, homework
First midterm exam (theoretical)	20	Covers learning outcomes of the first half of the semester
Second midterm exam (theoretical)	20	Covers advanced learning outcomes of the second half of the semester
Final exam (theoretical)	50	Comprehensive exam covering integrated design problems and case analysis
Total	**100**	Total

Reference:

- تخمين ومواصفات الأعمال الإنشائية، المهندس غانم عبد الرحمن بكر
- التخمين والمواصفات، مدحت فضيل فتح الله
- شروط المقاولات لأعمال الهندسة المدنية بقسميها الأول والثاني، وزارة التخطيط والتعاون الإنمائي، ٢٠٠٥
- المواصفات الفنية العامة، المكتب الاستشاري في معهد التكنولوجيا/بغداد، طبعة أولى، ١٩٨٢
- Construction, Planning & Technology, Rajiv Gupta, 1984.
- Construction, Planning Equipment & Methods, R.L. Peurifoy et al, 7th ed., 2006.

- General technical conditions and specifications, book -1 / 2, specification of materials workmanship of civil engineering works, 2nd ed., 2002.
- Building construction handbook, R. Chudley and R. Greeno, 5th ed., Elsevier Butterworth-Heinemann, 2004.
- Practical Standard Methods of Measurement Cost Estimating in the Design Stage, Hong-Kong, 2001.
- The civil engineering handbook / edited by W.F. Chen and J.Y. Richard Liew, 2nd ed., by CRC press LLC, Ch. 1, Construction, 2003 .

Course Description: Environmental Engineering

1. Educational Institution:
Technical Engineering College – Baghdad

2. Academic Department:
Construction and Building Engineering Technology

3. Course Title / Code:
Environmental Engineering / BCET405

4. Modes of Attendance:
Lecture, Laboratory

5. Semester / Academic Year:
2024–2025

6. Contact Hours:
180 hours per week

7. Date of Description Preparation:
١١ /0٥/2024

8. Course Objectives

1. Introduce students to sources of environmental pollution (water, air, soil, noise) and their effects on health and the environment.
2. Equip students with the ability to analyze and measure environmental pollutants using laboratory and engineering techniques.
3. Enable students to understand water and wastewater treatment technologies in accordance with local and international standards.
4. Familiarize students with methods for controlling air pollution and mitigation techniques.
5. Study solid waste management methods and recycling in engineering projects.
6. Link environmental concepts with sustainable development and modern technologies.
7. Promote commitment to environmental standards and relevant national and international laws.

9. Affective and Value Objectives

A. Affective Objectives:

1. Develop student awareness of the importance of environmental protection and conservation of natural resources.
2. Strengthen responsibility and discipline in addressing environmental issues.
3. Foster attention to quality and precision in environmental work and its impact on public health.

4. Build self-confidence in proposing innovative environmental engineering solutions.
5. Enhance flexibility in accepting scientific opinions and technical critique for performance improvement.

B. Ethical and Professional Values:

1. Uphold academic integrity in collecting and analyzing environmental data.
2. Respect intellectual property when using environmental studies and research.
3. Promote teamwork and collaboration in implementing environmental projects.
4. Adhere to occupational safety standards in environmental laboratories.
5. Instill a culture of sustainability and awareness of the engineer's responsibility towards society and the environment.

10. Learning Outcomes

A. Learning Outcomes:

1. Identify sources and types of environmental pollution.
2. Analyze environmental samples (water, air, soil) using measurement techniques.
3. Design simplified systems for drinking water and wastewater treatment.
4. Apply methods to control air and noise pollution.
5. Select appropriate approaches for solid waste management and recycling.
6. Comply with environmental laws and standards in engineering projects.
7. Collaborate in preparing environmental field studies and reports.

B. Knowledge Objectives:

1. Introduce students to basic concepts of environmental engineering.
2. Understand the impact of pollution on human health and ecosystems.
3. Familiarize with engineering principles of water and air treatment.
4. Differentiate between traditional and modern technologies in environmental protection.
5. Recognize local and international environmental laws and regulations.

C. Skills Objectives:

1. Conduct laboratory analyses of water, soil, and air samples.
2. Design preliminary water treatment units.
3. Use modern tools and software in environmental data analysis.
4. Prepare well-documented scientific environmental reports.
5. Apply sustainability principles in environmental engineering solutions.

11. Teaching and Learning Methods

- Theoretical lectures to explain concepts.
- Practical laboratory sessions for sample analysis.
- Field visits to projects or treatment plants.

- Presentations and case study discussions.
- Teamwork on mini research projects.
- Independent learning through assignments and extra readings.

12. Assessment Methods

Type of Assessment	Weight (%)	Method
Continuous practical assessment, commitment, and professional conduct	10%	Student performance in labs, assignments, punctuality, accuracy
First midterm exam (theoretical)	20%	Analytical and applied questions
Second midterm exam (theoretical)	20%	Problem-solving and case studies
Final exam (practical)	10%	Comprehensive hands-on assessment
Final exam (theoretical)	40%	Comprehensive written exam covering theoretical aspects
Total	**100%**	

Refernces

- Davis M. l. and S. J. Masten “Principles of environmental engineering and science “Mcgraw – Hill companies Inc., USA, 2004.
- Mihelcic J. R. and J. B. Zimmorman “Environmental engineering fundamentals, Sustainability, Design”, john Willey & sons, USA, 2010 .
- Swamee P. K. and A. K. Sharma “Design of water supply pipe network” Wiley inter science, A. John Wiley & sons Inc. Publication, 2008.

Course Description: Construction Drawing

1. Educational Institution
Technical Engineering College – Baghdad

2. Academic Department
Construction and Building Engineering Technologies

3. Course Title / Code
Structural Drawing / BCET406

4. Modes of Attendance
Lecture, Laboratory

5. Semester / Academic Year
2024–2025

6. Total Study Hours
90 hours

7. Date of Description Preparation
١١/٥/2024

8. Course Objectives

This course aims to provide students with the theoretical knowledge and practical skills necessary to prepare and interpret structural drawings of various elements in civil structures, in line with engineering standards and specifications. Upon completion, students are expected to:

1. Acquire the ability to read and analyze structural drawings of basic building elements such as foundations, columns, beams, slabs, walls, and staircases.
2. Develop skills in preparing working drawings for reinforced concrete elements, including reinforcement details and cross-sections.
3. Apply approved symbols, terminology, and scales in line with local and international codes (e.g., ACI Code, Iraqi Code).
4. Learn methods for presenting structural information clearly and accurately on drawings to ensure proper site execution.
5. Link structural design and calculations with working drawings, enabling students to translate design concepts into executable drawings.
6. Use digital software (e.g., AutoCAD) to produce drawings efficiently and accurately.
7. Promote professional and ethical commitment by respecting technical specifications and engineering standards in preparing drawings.

9. Affective and Value Objectives

A. Affective Objectives

- Strengthen accuracy and attention to detail in producing engineering drawings.
- Foster responsibility and discipline in completing engineering tasks within deadlines.
- Enhance interest in the quality and precision of technical work.
- Build self-confidence and pride in individual and group technical achievements.
- Develop flexibility and receptiveness to technical feedback for improved performance.

B. Ethical and Professional Values

- Uphold academic and professional integrity in preparing structural drawings without alteration or negligence.
- Respect intellectual property rights when using pre-existing models or structural designs.
- Encourage teamwork and collaboration in joint drawing projects.
- Adhere to engineering safety standards during planning and execution of drawings.
- Commit to local and international technical and engineering codes in preparing working drawings.
- Promote sustainability by recognizing the role of accurate drawings in minimizing waste and improving execution efficiency.

10. Learning Outcomes

A. Learning Outcomes

By the end of the course, students will be able to:

1. Read and interpret all types of structural drawings and analyze their components.
2. Draw structural details of reinforced concrete elements (foundations, columns, beams, slabs, stairs, etc.).
3. Apply correct symbols and scales according to local and international codes.
4. Produce accurate working drawings using engineering software such as AutoCAD.
5. Demonstrate ethical and professional conduct in preparing and documenting drawings.
6. Collaborate effectively in teams to complete drawing projects.

B. Knowledge Objectives

1. Understand the fundamentals of engineering and structural drawing.
2. Recognize structural elements and their functions in buildings.
3. Comprehend the relationship between structural design, calculations, and working drawings.
4. Differentiate between types of sections, symbols, and technical terminology.
5. Gain knowledge of structural code requirements related to working drawings.

C. Skills Objectives

1. Prepare digital structural drawings with high accuracy.
2. Produce reinforcement details for various structural elements professionally.

3. Use engineering software (e.g., AutoCAD) in structural drawing.
4. Organize and arrange drawings on engineering sheets clearly and systematically.
5. Apply proper engineering standards in scales, labeling, and annotations.

11. Teaching and Learning Methods

- Theoretical lectures for fundamental concepts.
- Classroom exercises and practical workshops.
- Use of engineering software.
- Presentations and illustrative models.
- Teamwork in mini-projects.
- Independent learning through assignments.

12. Assessment Methods

Type of Assessment	Weight (%)	Method
Continuous practical assessment, commitment, and professional conduct	20	Student performance in labs, assignments, punctuality, accuracy, participation in projects
Midterm Exam I (theoretical)	15	Understanding and analyzing drawings
Midterm Exam II (theoretical)	15	Application-based questions
Final Exam (theoretical)	50	Drawing analysis and application of concepts
	100	Total

References:

- Manual of Standard Practice for Detailing Reinforced Concrete Structures (ACI 315-747).
- Reinforced Concrete Designer’s Handbook / Reynolds, C.E. &Steed Man. J.C.
- Foundation Analysis & Design / Bowles J.E.
- A Manual of Engineering Drawing for Students & Drafts / French. T.E.
- Structural Details in Concrete / M.Y.H. Bangash.
- Irrigation Principles & Practices / Israclson.
- The design of prestressed concrete bridges / ROBERT BENIM.
- Detailing for steel construction, second edition, AISC.
- الكود المصري لتصميم المشأت الكونكريتية رقم ٢٠٣ / دليل التفاصيل الانشائية

Course Description – ISO (BCET407)

1. Educational Institution

Technical Engineering College – Baghdad

2. Academic Department

Construction and Building Engineering Technologies

3. Course Name / Code

ISO / BCET407

4. Available Attendance Modes

Lecture

5. Semester / Academic Year

2024–2025

6. Total Study Hours

60 hours

7. Date of Description Preparation

11/05/2024

8. Course Objectives

This course aims to introduce students to the concepts of quality and ISO standards, with a focus on their application in construction and building. The course covers international ISO standards and the importance of quality in controlling production and inspection processes, in addition to using statistical methods for sample testing and data analysis. It also discusses major topics related to the quality of materials, processes, documents, and construction outputs.

By the end of the course, students will be able to:

1. Understand the fundamentals of ISO standards, especially ISO 9001 (Quality Management System), and its relation to construction projects.
2. Apply ISO standards in construction projects.
3. Analyze and evaluate quality using statistical methods, including:
    - Sampling techniques
    - Mean and standard deviation

    - Statistical control charts
    - Process capability
    - Normal distribution
    - Hypothesis testing
4. Promote a culture of quality through documentation and monitoring of processes.
5. Understand major quality topics in construction such as:
    - Quality control of materials (concrete, steel, bricks, etc.)
    - Risk and quality management
    - Documentation and records control
    - Cost of quality
    - Internal auditing
6. Link quality with sustainability and occupational safety.
7. Recognize the importance of certifications such as ISO 14001 (Environment) and ISO 45001 (Occupational Health & Safety), and their application in construction projects.

9. Affective and Value-Based Goals

At the affective (emotional) level:

1. Appreciate the importance of quality as an essential part of engineering practice.
2. Respect procedures and discipline in testing and analysis.
3. Develop responsibility towards the quality of construction outputs.

At the value (ethical/professional) level:

1. Commit to honesty in documenting test results.
2. Respect local and international codes and standards.
3. Promote integrity and transparency in office and fieldwork.
4. Adhere to safety standards in planning and executing projects.

10. Learning Outcomes, Teaching Methods & Assessment

Learning Outcomes

By the end of the course, students will be able to:

1. Explain principles of Quality Management Systems and ISO standards in construction.
2. Apply statistical tools for sample quality analysis and process control.
3. Evaluate compliance of construction projects with international quality standards.
4. Prepare technical reports based on inspection and analysis results.
5. Demonstrate professional behavior committed to quality, transparency, and accountability.

Cognitive Goals:

- Identify fundamental quality concepts and international QMS.
- Explain ISO 9001:2015 requirements and applications in construction.

- Describe other related standards (ISO 14001, ISO 45001).
- Interpret the relationship between quality management and project success.
- Apply quality inspection procedures for construction materials (concrete, steel).
- Use statistical methods to analyze inspection results.

Skills-Based Goals:

- Apply ISO requirements in case studies of construction projects.
- Conduct sampling scientifically and accurately.
- Use quality tools such as control charts and process capability.
- Prepare technical reports according to international standards.
- Develop internal audit plans for quality systems.
- Present case studies demonstrating compliance with ISO.

11. Teaching and Learning Methods

- Theoretical lectures to explain core concepts.
- Classroom exercises and practical workshops.
- Presentations and illustrative models.
- Group projects in small teams.
- Independent learning through assignments.

12. Assessment Methods

13. Admission Standards

Admission refers to the set of academic and administrative requirements that determine student eligibility for the program, ensuring selection of candidates capable of achieving program goals.

Objectives:

- Ensure fairness and transparency.
- Verify students possess the required foundational knowledge and skills.
- Align student abilities with program requirements.
- Support quality education by admitting academically prepared students.

General Conditions:

1. High school certificate or equivalent, with GPA according to Ministry of Higher Education regulations.
2. Passing competitive test/interview (if required).
3. Completion of administrative requirements (student file, medical check).
4. Compliance with geographic/ministerial admission rules.
5. No full-time employment for morning study students.
6. For special admission channels (parallel, martyrs' families, etc.), specific rules apply.

14. Key Program Information Sources

Internal sources:

- Academic program guide
- College/department official website
- Student handbooks and announcements
- Course description files

External sources:

- Ministry of Higher Education guide
- Academic and industrial partnerships

15. Program Development Plan

Objectives:

- Update course content with scientific/technical advances.
- Improve teaching and assessment methods.
- Strengthen practical/technical skills.
- Align program with labor market needs.
- Enhance staff competencies through professional development.
- Achieve accreditation at national/international levels.

Implementation:

- Formation of sub-committees.
- Annual surveys of students and graduates.
- Curriculum workshops and learning outcome reviews.
- Regular evaluations with quality assurance unit.

Timeline: 1–4 years with annual reviews.
Evaluation: Key performance indicators (KPIs), graduate satisfaction, graduation rates.

Type of Assessment	Weight (%)	Description
Class participation, exercises, homework, and discipline	10	Continuous assessment
Statistical problems and theory (first half of course)	20	Midterm Exam 1
Application of statistical methods for sample compliance	20	Midterm Exam 2
Comprehensive exam covering all outcomes, including statistical and theoretical problems	50	Final Exam
Total	**100**	

Reference

- الضبط المتكامل لجودة الانتاج / د . محمود سلامة عبدالقادر
- ISO 9000 / Rolhery.
- طارق الشباكي الجودة في المنظمات الحديثة / مأمون الداركة ،
- د. روحي الشريف / دليل ضبط الجودة في صناعة الخرسانة
- أ.د محمد عبدالوهاب العزاوي / ISO 9000 , ISO 14000 أنظمة ادارة الجودة والبيئة
- Applying ISO 9000 Quality Management Systems / Arora S.C.

Course Description – Computer Applications (3) (BCET408)

1. Educational Institution

Technical Engineering College – Baghdad

2. Academic Department

Construction and Building Engineering Technologies

3. Course Name / Code

Computer Applications (3) / BCET408

4. Available Attendance Modes

Lectures (theoretical)

5. Semester / Academic Year

2024–2025

6. Total Study Hours

90 hours

7. Date of Description Preparation

١١/٥/2024

8. Course Objectives

The course *Computer Applications (3)* aims to introduce students to computer applications used in civil engineering, particularly **STAAD.Pro**. By the end of the course, students are expected to acquire the following skills and achieve the following objectives:

1. Analyze and design various structural systems.
2. Develop three-dimensional models for buildings, bridges, and other structures.
3. Perform detailed analysis of loads, forces, and moments.
4. Ensure the safety and stability of structural systems.

9. Affective and Value-Based Goals

- Provide civil engineering students with a flexible modeling environment that enables them to design accurate and optimal structural systems.
- Learn to select and apply various design codes by engaging in certification programs or online training.

- Familiarize students with advanced tools and calculations available in STAAD.Pro, allowing efficient and accurate structural design.
- Encourage students to use professional software without requiring overly advanced prior skills, ensuring accessibility and usability.

10. Learning Outcomes, Teaching & Assessment Methods

Learning Outcomes

Upon completion of *Computer Applications (3)*, the student will be able to:

- Accurately analyze and design different structural systems, including buildings, bridges, tunnels, and dams.
- Create three-dimensional models of engineering projects, facilitating visualization of structures and identification of potential weaknesses.
- Reduce reliance on manual calculations, thereby saving time and increasing efficiency.
- Conduct structural load analysis, including dead loads, live loads, wind loads, and seismic loads.
- Design structural elements such as columns, beams, and walls, considering applied loads and forces.
- Verify design compliance with engineering codes and specifications to ensure safety and standards adherence.
- Generate detailed structural analysis and design reports, facilitating communication of results with clients and stakeholders.

11. Teaching and Learning Methods

- **Theoretical Lectures**: Using presentations and whiteboard to explain fundamental concepts, theories, and calculations.
- **Tutorial Sessions**: Solving example problems to reinforce theoretical knowledge.
- **Assignments and Homework**: Regular design-based tasks to encourage independent practice and application.
- **Design Projects**: Individual or group projects simulating real-world designs (e.g., foundations of a small building).
- **Class Discussions**: Case studies and critical questions to enhance participation and critical thinking.
- **Software Training**: Workshops or lectures dedicated to using specialized structural analysis and design software such as **STAAD.Pro**.

12. Assessment Methods

Type of Assessment	Weight (%)	Method
Continuous assessment (class participation, short presentations, assignments, and commitment, including an applied project such as writing a technical report or preparing	10%	Classroom work (Continuous assessment)

Type of Assessment	Weight (%)	Method
a CV with a presentation)		
Midterm Exam 1 – focused on technical terminology, reading comprehension, and professional correspondence writing	20	Midterm 1
Midterm Exam 2 – focused on technical terminology, reading comprehension, and professional correspondence writing	20	Midterm 2
Final Exam – comprehensive exam covering all course skills (reading, writing, listening), with emphasis on analyzing real-world case studies	50	Final Exam
Total	**100**	

References

- STAAD. pro 2006 Getting Started & Examples Manual / esearch Engineer.
- Structural Analysis / R.C. Hibbeler.
- نظرية الانشاءات / د. عبدالفتاح ديوان و أحمد فهمي
- تصميم المنشآت الخرسانية والمنشآت مسبقة الجهد / د. علاء محمود حسين النجمي

Course Description – English Language (4)

1. Educational Institution:
Technical Engineering College – Baghdad

2. Academic Department:
Building and Construction Engineering Technology

3. Course Title / Code:
English Language (4) / BCET409

4. Mode of Delivery:
Theoretical Lectures

5. Semester / Year:
Academic Year 2024–2025

6. Total Study Hours:
60 Hours

7. Date of Description Preparation:
١١/٥/2024

8. Course Objectives

The "Technical English" course aims to equip fourth-year students in the Department of Building and Construction Engineering with advanced language skills necessary to excel in the global engineering environment. Students will learn how to read and comprehend complex technical texts such as technical specifications, project reports, and scientific research.

The course also focuses on developing formal writing skills, including preparing CVs, writing professional emails, and drafting technical reports with clarity and precision. Additionally, it covers oral communication skills and specialized engineering terminology to enable students to participate effectively in meetings and technical discussions.

Ultimately, the course aims to prepare engineers who can confidently and competently communicate in international engineering projects.

Upon completion, students are expected to be able to:

- **Technical Reading:** Analyze engineering documents in English, such as operation manuals and technical specifications.
- **Technical Writing:** Prepare structured reports on engineering projects (e.g., progress reports, site inspection reports).
- **Professional Correspondence:** Write formal emails and other professional communications effectively.

- **Resume Writing:** Prepare a CV and cover letter tailored for engineering jobs in English.
- **Engineering Terminology:** Build a wide vocabulary of specialized technical terms.
- **Presentation Skills:** Deliver clear and persuasive technical presentations in English.
- **Meeting Participation:** Engage confidently in technical meetings and discussions.
- **Listening & Comprehension:** Improve listening skills for understanding technical lectures, webinars, and professional discussions.
- **Contracts & Tenders:** Read and interpret contractual terms and conditions in international engineering tenders.
- **Academic Research:** Search for and properly cite engineering papers and articles in English.
- **Cross-Cultural Communication:** Understand professional etiquette in multicultural environments.
- **Critical Thinking:** Use English as a tool for analyzing engineering problems and discussing solutions.

9. Affective (Value-Based) Objectives

1. **Building Self-Confidence** – Enhancing students' confidence in using English in professional contexts.
2. **Appreciating the Importance of English** – Recognizing English as a tool for career growth and global knowledge.
3. **Motivation for Lifelong Learning** – Encouraging continuous language development beyond the course.
4. **Positive Attitude Toward Communication** – Transforming fear or hesitation into opportunities for knowledge exchange.
5. **Respecting Cultural Diversity** – Understanding and appreciating cultural differences in international workplaces.
6. **Commitment to Accuracy & Professionalism** – Instilling precision in terminology and professionalism in communication.
7. **Encouraging Initiative** – Motivating students to take initiative in seeking and sharing technical information in English.
8. **Enjoyment of Language Use** – Helping students find satisfaction and pride in mastering technical English.

10. Course Outcomes

A. Knowledge Outcomes:

- Recognize a broad range of specialized technical terms.
- Understand the structure and types of engineering documents.
- Comprehend basic rules of academic and professional writing.

B. Skill Outcomes:

- Write clear and concise technical reports and professional messages.
- Deliver effective oral presentations on technical topics.
- Analyze and extract key information from complex engineering texts.

- Actively participate in discussions and technical meetings.

C. Affective Outcomes:

- Demonstrate confidence when using English in professional settings.
- Appreciate the role of English in engineering success.
- Commit to accuracy and professionalism in all forms of communication.

11. Teaching and Learning Methods

By Instructor:

1. **Interactive Lectures** – Presenting concepts and technical terminology with student engagement.
2. **Task-Based Learning** – Assignments simulating workplace communication (e.g., technical emails, report summaries).
3. **Case Studies** – Analysis of real-world engineering projects and documents.
4. **Blended Learning** – Combining traditional lectures with online resources (videos, articles, interactive platforms).
5. **Workshops** – Focused sessions on specific skills (e.g., CV writing, presentation skills).
6. **Multimedia Integration** – Using videos, interviews, and documentaries to improve listening and comprehension.

By Students:

1. **Collaborative Learning** – Group projects (e.g., presentations, joint reports).
2. **Role-Playing & Simulation** – Simulating job interviews, negotiations, and meetings.
3. **Guided Self-Study** – Reading engineering articles or watching webinars for discussion.
4. **Presentations** – Individual or group presentations on technical topics.
5. **Peer Review** – Reviewing and providing feedback on classmates' reports and CVs.
6. **Portfolio Building** – Compiling written works (reports, CVs, technical emails) as a record of progress.

12. Assessment Methods

Method	Weight (%)	Type of Assessment
Class participation, short presentations, assignments, and applied project (e.g., technical report, CV + presentation)	10	Continuous Assessment
Midterm 1 – technical terms, reading comprehension, professional correspondence	20	Midterm Exam 1
Midterm 2 – technical terms, reading comprehension, professional correspondence	20	Midterm Exam 2
Final Exam – comprehensive exam covering reading, writing,	50	Final Exam

Method	Weight (%)	Type of Assessment
listening; focus on real case analysis		
Total	**100**	

References

- Book: Academic Writing for Graduate Students (3rd ed.) by Swales & Feak (2012). University of Michigan Press.
- Article: "Digital Tools for Academic Writing" (2021). Journal of English for Academic Purposes, 52. [DOI: 10.1016/j.jeap.2021.100996].
- Online Resource: Purdue OWL (Online Writing Lab) – Updated 2023. https://owl.purdue.edu.

Graduation Project – Course Description

1. Educational Institution:
Technical Engineering College – Baghdad

2. Academic Department:
Construction and Building Engineering Technologies

3. Course Title/Code:
Graduation Project / BCET409

4. Modes of Attendance:
Supervisory meetings, discussions, field/office work, presentations

5. Semester/Academic Year:
Academic Year 2024–2025

6. Credit Hours:
180 Hours

7. Date of Description Preparation:
١١/٥/2024

8. Course Objectives

- Formulate a clear engineering problem and develop a work plan to study or solve it.
- Collect and analyze theoretical and field-related information relevant to the project.
- Apply engineering software and modern technologies in data processing and solution design.
- Write an organized engineering report that follows scientific style, documentation, and presentation.
- Deliver an oral/visual presentation explaining project results and defend them before the examination committee.
- Develop teamwork, collaboration, and effective communication skills within an engineering team.

9. Affective and Value-Based Objectives

A. Affective (Emotional) Level:

- Enhance self-confidence when facing real engineering problems.
- Develop the ability to handle work pressure and meet deadlines.
- Encourage creativity and innovation in proposing ideas and solutions.
- Foster a spirit of cooperation and teamwork.

B. Value-Based (Ethical and Professional) Level:

- Commit to academic integrity and avoid plagiarism or undocumented copying.

- Respect intellectual property rights of sources, references, and software.
- Strengthen a culture of quality in engineering and research work.
- Promote sustainability and social responsibility in selecting project topics and outcomes.

10. Course Learning Outcomes

Knowledge and Understanding:

- Understand the steps of scientific research and engineering design.
- Recognize methods of formulating research problems and defining objectives.
- Comprehend data collection and analysis methodologies.

Intellectual and Practical Skills:

- Develop and implement a work plan for an engineering project.
- Analyze results and draw both scientific and practical recommendations.
- Prepare a comprehensive and structured research report.
- Deliver an effective oral presentation supported with multimedia.

Values and Behavioral Skills:

- Work effectively in multidisciplinary teams.
- Commit to deadlines and quality standards.
- Adhere to professional and ethical values throughout all project stages.

11. Teaching and Learning Methods

- Regular supervisory meetings with the academic advisor.
- Project-Based Learning (PBL).
- Field visits or real-life case studies (depending on project nature).
- Group discussions and workshops.
- Progress presentations for continuous evaluation.

12. Assessment Methods

Type of Assessment	Weight %	Evaluation Method
Supervisor's follow-up and progress evaluation	20	Progress reports, adherence to schedule, level of engagement
Final project report	50	Scientific and technical evaluation based on engineering research criteria
Oral presentation and defense	20	Presenting results and defending them before the examination committee
Professional conduct and commitment	10	Discipline, teamwork, and adherence to research ethics
	100	Total

Course Description: Professional Ethics

1. Educational Institution:
Technical Engineering College – Baghdad

2. Academic Department:
Construction and Building Engineering Technologies

3. Course Title/Code:
Professional Ethics / BCET411

4. Modes of Attendance:
Lectures, discussions, workshops

5. Semester/Academic Year:
2024–2025

6. Credit Hours:
2 hours per week – 30 hours per semester (one semester)

7. Date of Description Preparation:
11/5/2024

8. Course Objectives

This course aims to provide students with theoretical and value-based knowledge related to ethical practices in engineering and technical professions, preparing them to assume professional and social responsibilities in accordance with standards of integrity and honesty.

By the end of the course, students are expected to:

1. Understand the fundamental principles of professional ethics in engineering.
2. Recognize the relationship between ethical behavior and the quality of engineering performance.
3. Become familiar with local and international laws and regulations governing engineering practice.
4. Analyze ethical situations and make sound professional decisions.
5. Strengthen values of integrity, transparency, and accountability in professional practice.
6. Develop the ability to address ethical challenges in modern engineering projects.

9. Affective and Value-Based Objectives

A. Affective (Emotional) Level:

1. Strengthen a sense of belonging to the profession and pride in engineering values.
2. Develop a sense of responsibility toward society and the environment.

3. Enhance critical awareness and the ability to evaluate professional behavior.
4. Promote discipline and self-commitment in work.
5. Foster respect for others and professional handling of differences.

B. Value-Based (Ethical and Professional) Level:

1. Commitment to academic and professional integrity.
2. Respect for professional laws and regulations.
3. Promotion of justice and impartiality in decision-making.
4. Adoption of sustainability and social responsibility principles.
5. Respect for the privacy and rights of colleagues and clients.
6. Reinforcement of ethical leadership in the workplace.

10. Course Learning Outcomes

Learning Outcomes:

- Knowledge of the foundations and principles of professional ethics.
- Ability to analyze contemporary professional ethical issues.
- Formulating ethical solutions to professional dilemmas.
- Commitment to professional values in academic and future practices.
- Active participation in group discussions on professional ethics.

Knowledge-Based Objectives:

- Familiarity with the history and development of professional ethics.
- Awareness of global engineering codes of conduct.
- Understanding the relationship between ethics, occupational safety, and project quality.

Skills Objectives:

- Critical analysis of professional situations.
- Application of ethical principles to practical scenarios.
- Ability to propose practical solutions in matters of integrity and transparency.
- Development of ethical dialogue and discussion skills.

11. Teaching and Learning Methods

- Theoretical lectures.
- Classroom discussions and case studies.
- Student presentations.
- Practical workshops.
- Group activities to enhance teamwork.
- Homework assignments (analytical reports).

12. Assessment Methods

Type of Assessment	Weight %	Method
Classroom participation and professional conduct	30	Attendance, discipline, interaction
First written exam	20	Analytical questions and ethical issues
Second written exam	20	Case study and solution discussion
Final exam	30	Essay questions and critical analysis
	100	Total

References:

- د. يحيى خليف (مدخل الى اخلاقيات مهنة الهندسة)، جامعة الكلك فهد للبترول والمعادن، ٢٠٠٠.
- د.احمد جابر حسنين (اخلاقيات العمل بين الدين والمجتمع)،٢٠١١.
- اتحاد المهندسين العرب: ميثاق اخلاق مهنة الهندسة، ٢٠١٨.
- مدونة اخلاقيات ممارسة المهنة الهندسية، وزارة الاعمار والاسكان والبلديات والاشغال العامة، الطبعة الاولى، ٢٠١٧.

Guidance for New Faculty Members

In order to ensure the quality of education, raise the academic level of students, and facilitate the integration of new colleagues into the university environment, we present these guidelines, which clarify the basic roles and responsibilities of faculty members, in accordance with university policies and academic ethics.

First: Academic Responsibilities

1. Prepare lectures regularly and update academic content to keep pace with recent developments.
2. Prepare course descriptions and accurately define learning outcomes according to academic quality standards.
3. Adhere to the study plan and ensure a balance between theoretical and practical aspects.
4. Use modern teaching methods and utilize technology to motivate students and facilitate learning.
5. Evaluate students fairly and transparently using clear and announced assessment criteria.

Second: Administrative and Organizational Aspects

1. Adhere to official working hours and lecture schedules accurately.
2. Document absences and attendance and monitor student performance on a regular basis.
3. Submit monthly or quarterly reports to the department chair, as requested.
4. Cooperation in institutional activities (seminars, conferences, and departmental committees).

Third: Participation in development and quality

1. Contribute to curriculum development and periodic review.
2. Adhere to quality assurance and academic accreditation standards.
3. Participate in research and professional development activities.

4. Adhere to university policies regarding self-assessment and institutional assessment.

Professional development for faculty members

Professional development objectives:

1. Updating scientific knowledge and the academic content of courses.
2. Developing teaching, assessment, and classroom management skills.
3. Enhancing research capabilities and scientific publishing in reputable journals.
4. Enabling the use of modern technologies and e-learning methods.
5. Supporting teamwork, academic leadership, and participation in institutional activities.
6. Establishing professional ethics and adherence to quality standards and academic accreditation.

Professional development axes:

1. For academic and educational training:

• Workshops on curriculum design and course descriptions.
• Courses on modern teaching and learning strategies.
• Developing assessment skills, preparing question banks, and evaluation Alternative.

2- Research and Scientific Development:

• Courses in research methodology and publishing in Q1–Q4 journals.
• Encouraging the writing of research projects and applying for internal and external grants.
• Attending and participating in local and international scientific conferences.

3- Technical Skills and Digital Transformation:

• Training in the use of Learning Management Systems (LMS) such as Moodle or Google Classroom.
• Familiarization with artificial intelligence tools in education.
• Proficiency in engineering drawing, statistics, and scientific analysis programs.

Implementation Mechanisms:

• Preparing an annual professional development plan in coordination with the Quality Assurance Division.

• Requiring each instructor to participate in a specific number of workshops/courses annually.

• Providing technical and logistical support for attending courses outside the institution.

• Evaluating the impact of professional development on performance through self-assessment forms and follow-up.

13- Admission Standard

Definition of Standard:

The admission standard refers to the set of academic and administrative requirements that determine a student's eligibility to enroll in the academic program, ensuring the selection of students capable of successfully continuing their studies and contributing to achieving the program's objectives and its educational outputs.

The goals of the acceptance criterion:

1. Ensuring the justice and transparency of the admission process.
2. Ensure that students have the appropriate constituent skills and knowledge for specialization.
3. Achieving harmony between students 'capabilities and the requirements of the academic program.
4. Supporting the quality of education by choosing academic and behaviorally qualified students.

Public acceptance conditions and criteria:

1. Obtaining a preparatory certificate (high school) or equivalent, at a rate), according to the instructions of the Ministry of Higher Education.
2. Pass the competitive test or comparison if any.
3. Pass the personal interview or skill assessment (in some applied specializations).
4. Complete administrative requirements (student file, pledges, healthy fitness examination).

5. Commitment to geographical distribution or ministerial instructions for central admission.
6. Commitment to not combine morning study with any official job (for morning studies).
7. In the event of accepting a special channel (parallel, the families of the martyrs, etc.), the conditions for that channel are applied.

IPO applications app:
• Dependent the college/department follows the instructions of the Ministry of Higher Education and Scientific Research annually.
• Names are approved through central admissions or through direct application for special programs.
• Records of accepted students are maintained, and reasons for exclusion, if any, are documented.
• The Registration Department monitors the application of the standard and coordinates with departments to ensure its accuracy.

Note:
The admission standard is updated annually in accordance with the Ministry's instructions. All concerned parties must adhere to the percentages and specifications officially approved each academic year.

14- The Most Important Sources of Information About the Program

First: Official Internal Sources for the Program

1- The Program's Academic Guide: Contains course descriptions, program plan, evaluation system, learning outcomes, graduation requirements, etc.
2- The College/Department's Official Website: Includes information about the program, study plan, faculty members, admission requirements, forms, and news updates.
3- Student Handbooks and Internal Announcements: Includes instructions for registration, evaluation, academic advising, and university life behaviors.
4- Course Description Files: Clarify the learning objectives and outcomes, teaching methods, and assessment for each course.

Second: External or Reference Sources

1- The Ministry's Guide Higher Education and Scientific Research: Includes admission requirements, accreditation, and general standards for academic programs.

2- Academic and Industrial Partnerships: Includes collaboration with supporting companies or training institutions.

The importance of providing