

Modules Catalogue |2025-2026|

Samarra University



First cycle - Bachelor's degree-Civil Engineering

Bachelor of Science - Civil Engineering



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1. Overview

This guide covers the courses (units) offered by the Civil Engineering program for the Bachelor of Science degree. The program offers (9) units with a total of (1335) student work hours and 60 credit hours. The offering of units is based on the Bologna process.

consideration And general

This guide covers the subjects taught in the Civil Engineering programme for the Bachelor of Science. It presents an addition of (9) subjects already, for example, with (1335) total student load hours and 60 total European units. The presentation of the subjects is based on the Bologna process.

2. University Courses 2025-2026

Module 1

The symbol	Course/Unit Title	ECTS	Semester
UOE-1101	Computer I	3.00	1
Class (hr/w)	Lab	SSWL (hr/sem)	USSWL (hr/sem)
2	2	63	12
Description			
Teaching the student the basic rules of computers and their management to help him complete projects, printing matters, preparing statistics and graphs, creating presentations, designing engineering plans, etc., and the emergence of the Internet as a means available to everyone, the student learns to use the computer and digital publications through electronic correspondence, web pages, and electronic conversation.			

Module 2

The symbol	Course/Unit Title	ECTS	Semester
CE112	mathematics	10	1
Class (hr/w)	Tutor	SSWL (hr/sem)	USSWL (hr/sem)
4	4	123	127
Description			
The course aims to introduce the basic methods of calculus and analytical geometry as an introduction to their use in some engineering applications of calculus and solving simple differential equations, using quantitative and numerical methods to solve engineering problems, using basic knowledge to search for new techniques, in addition to extracting and evaluating the information necessary to apply engineering analysis methods to unfamiliar problems. Teaching and learning methods			

- Scientific and research skills are developed through teaching and learning activities. Analytical and problem-solving skills are also developed through a set of problems prepared by lecturers through small study groups. All submitted work is evaluated and responded to.

Module 3

The symbol	Course/Unit Title	ECTS	Semester
CE113	Engineering drawing	8.00	1
Class (hr/w)	Lab	SSWL (hr/sem)	USSWL (hr/sem)
4	4	123	77
description			
<p>It is noted that facilities, buildings and construction projects have developed significantly in recent years, and thus the methods of presenting engineering ideas and plans have developed with them, and there has been a great reliance on modern technologies such as computers and engineering programs in presenting engineering plans. Therefore, this course aims to introduce the student to the methods and tools of paper engineering drawing, how to read plans, and ways to find dimensions or shapes not shown in the engineering drawing through some engineering processes and ideas related to engineering drawing. This course is also an important introduction to engineering drawing applications on the computer, as the civil engineering specialist will not be able to make the most of the computer unless he is fully familiar with the subject of engineering drawing.</p>			

Module 4

The symbol	Course/Unit Title	ECTS	Semester
CE114	Materials Construction	5	1
Class (hr/w)	Lab	SSWL (hr/sem)	USSWL (hr/sem)
3	2	63	62
Description			
<p>This course covers the mechanical properties of materials, - Binders: Gypsum: Manufacturing, Calcination Theory, Types of Products, Properties and Uses, and Physical Properties. Lime: Manufacturing, Calcination Theory, Types of Products, Properties and Uses, and Physical Properties. Bricks: Raw Materials, Harmful Components, Manufacturing Methods, Physical Properties, Products: Clay Bricks, Sand Lime Bricks, Concrete Bricks. Blocks: Manufacturing, Properties, Types of Blocks and Uses. Tiles: Manufacturing, Properties, Tile Tests, Types of Tiles. Wood: Types of Wood, Mechanical Properties of Wood, Wood Defects, Wood Curling. Metal: Types of Metal, Cast Iron, Wrought Iron, Steel, Mild Steel, Heat Treatment, Physical Properties.</p>			

Module 5

The symbol	Course/Unit Title	ECTS	Semester
UOE-1102	Arabic I	2	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/sem)
2	-	33	17
Description			
<p>This course aims to:</p> <ol style="list-style-type: none">1. Enabling students to understand the eloquence of the Holy Quran and to appreciate the aesthetics of the language in it.2. Training students to use punctuation marks between sentences correctly.3. To broaden the students' literary horizons of ideas, meanings and moral values.4. Teaching students how to write correctly according to the basics of spelling, which enables them to write words correctly.			

Module 6

The symbol	Course/Unit Title	ECTS	Semester
UOE-12012	Democracy and human rights	2	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/sem)
2	-	33	17
Description			
<p>The study of human rights aims to achieve several main objectives.:</p> <ol style="list-style-type: none">1. Promoting awareness and respect:<ul style="list-style-type: none">- Understanding human rights helps to raise awareness of the importance of the rights of every individual, regardless of race, religion, gender or social status.- Increase mutual respect among people and appreciation of cultural and social diversity.2. Promoting justice and equality:<ul style="list-style-type: none">- Emphasizing the importance of equality and justice in all aspects of life.- Providing the necessary tools to combat discrimination and injustice in society.3. Promoting peace and stability:<ul style="list-style-type: none">- Human rights promote understanding and peaceful coexistence among individuals and communities.- Reducing conflicts and disputes by promoting mutual respect and individual rights.			

Module 7

The symbol	Course/Unit Title	ECTS	Semester
CE121	Engineering Mechanics	12.00	2
Class (hr/w)	Tutor	SSWL (hr/sem)	USSWL (hr/sem)
6	4	153	147
Description			
<p>This course aims to introduce the basic methods for statistically analyzing determinate structures as an introduction to indeterminate structure analysis and structural design decisions. Course outcomes and teaching, learning and assessment methods are Newton's laws of motion and trigonometric laws are defined and applied to the addition and analysis of vector quantities, determination of moment of force and its value about a given axis, determination of moment of couple, description of the concept of dry friction, analysis of the equilibrium of solid objects subjected to this force, creation of "free body diagrams" for real-world problems, application of Newton's laws of motion and vector operations to evaluate the equilibrium of particles and objects, application of the principles of equilibrium of particles and objects to analyze forces in plane truss members, discussion of the concepts of "center of gravity" and "center of mass" and calculation of their location for irregularly shaped objects and application of the concepts used to determine the center of gravity and midpoints to find the result of a generally distributed load. Use the methods learned to balance objects and the result of a generally distributed load to calculate internal forces in beams. Generalize the procedure to create diagrams of bending moments and shear forces (internal forces), and use this information in engineering design.</p>			

Module 8

The symbol	Course/Unit Title	ECTS	Semester
CE122	AutoCAD	6.00	2
Class (hr/w)	Lab	SSWL (hr/sem)	USSWL (hr/sem)
2	3	78	72
Description			
<p>This course contains a detailed explanation of AutoCAD commands and their applications for solving drawing and design problems, where each command is fully explained with the help of examples and illustrations and the use of this command to draw projections and equal measurements of objects in engineering drawing. Cognitive objectives: Providing students with sufficient knowledge in AutoCAD to employ in design by developing students' practical, theoretical and creative abilities in various types of computer design techniques. Developing perception skills and knowledge of computer-aided design implementation technology to enrich students' experience using various AutoCAD techniques to complete the required design plans. The student can create any design plan on the program through which he can fully explain the idea.</p>			

Module 9

The symbol	Course/Unit Title	ECTS	Semester
CE123	Engineering statistics	5	2
Class (hr/w)	Tutor	SSWL (hr/sem)	USSWL (hr/sem)
2	2	63	62
a description			
<p>The course aims to introduce the student to the property of randomness in life data and the mathematical treatment of that data as well as the mathematical models that describe different types of life data - how to decide on the scientific values of simple models.</p>			

Module 10

The symbol	Course/Unit Title	ECTS	Semester
CE124	Engineering Geology	5.00	2
Class (hr/w)	Lab	SSWL (hr/sem)	USSWL (hr/sem)
2	2	63	62
Description			
<p>The course aims to provide basic information about the components of the Earth's crust, types of rocks, forms of geological structures, factors and forces affecting the Earth's crust, earthquakes, volcanoes, natural characteristics of soil, and groundwater geology as an introduction to the study of the geology of tunnels, dams, and reservoirs, and the use of geological maps and geological surveys. The cognitive objectives are to define the concept of engineering geology and its importance in knowing the origin, history, and formation of the Earth and the forces affecting its rocks, to identify environmental problems resulting from geological phenomena, their causes, and ways to reduce their effects, to describe engineering methods for analyzing and designing systems that help solve geological problems of foundations, and to clarify the sources of groundwater and its relationship to surface water and how to avoid its risks during implementation.</p>			

Module 11

The symbol	Course/Unit Title	European Points System	Semester
UOE-12011	English Language I	2.00	2
Semester (hour/week)	Lecturer/Laboratory/Practical/Teacher	SSWL (hour/semester)	USSWL (hour/week)
2	-	33	17
Description			
<p>The Scientific English course aims to provide students with some of the specific language skills they are likely to need when studying physics, mathematics, biology, chemistry or computer science in English. The course will also focus on the appropriateness of English in different contexts, with an emphasis on formal and academic contexts. The course therefore aims to develop the communication skills and specialist knowledge of English for science students and professionals, enabling them to communicate more confidently and effectively in their work or study environment.</p>			

Module 12

Code	Course/Module Title	ECTS	Semester
CE211	Strength of Materials I	6.00	3
Class (hr/w)	Tutor	SSWL (hr/sem)	USSWL (hr/sem)
3	2	78	72
Description			
<ol style="list-style-type: none"> 1. The course aims to provide the students with basic knowledge of material behavior, stress strain relations, and their analysis. 2. During the course, students will review mechanics first and obtain knowledge of stress-strain relations, and their types. 3. Students will review modern sources, and show the problems and their solving methods for all issues related to the strength of materials 			

Module 13

Code	Course/Module Title	ECTS	Semester
CE212	Fluid Mechanics I	6.00	3
Class (hr/w)	Lab/Tutor	SSWL (hr/sem)	USSWL (hr/sem)
2	4	93	57
Description			
<p>The fluid mechanics staff's goal is to give students a thorough understanding of fluid mechanics' foundational ideas, theories, and practical applications. We want to foster a profound understanding of the importance of fluid dynamics in diverse engineering fields and sectors. Our course aims to provide a solid grounding in the fundamentals of fluid mechanics through interesting lectures, lively discussions, and practical experiments. We work hard to help students hone their analytical and problem-solving abilities so they can accurately assess and forecast fluid behavior in real-world situations.</p>			

Module 14

Code	Course/Module Title	ECTS	Semester
CE213	Mathematics II	5.00	3
Class (hr/w)	Tutor	SSWL (hr/sem)	USSWL (hr/sem)
2	2	63	62
Description			
<p>After completing this module, students should demonstrate competency in the following skills:</p> <ol style="list-style-type: none"> 1. Use conical sections in real life applications. 2. Sketch the graph of a function using polar coordinate. 3. Convert point and functions from rectangular coordinate to polar coordinate. 4. Calculate area of shapes by use polar coordinate. 5. Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus. 			

Module 15

Code	Course/Module Title	ECTS	Semester
CE214	Engineering Surveying I	6.00	3
Class (hr/w)	Lab/ Tutor	SSWL (hr/sem)	USSWL (hr/w)
2	4	93	57
Description			
<p>Measuring certain dimensions that occur on or near the surface of the Earth. Surveying equipment such as levels and theodolites are used for accurate measurement of angular deviation, horizontal, vertical and slope distances. With computerization, electronic distance measurement (EDM), total stations, GPS surveying and laser scanning have to a large extent supplanted traditional instruments. Data collected by survey measurement is converted into a graphical representation of the Earth's surface in the form of a map. This information is then used by civil engineers, contractors and realtors to design from, build on, and trade, respectively. Elements of a structure must be sized and positioned in relation to each other and to site boundaries and adjacent structures.</p>			

Module 16

Code	Course/Module Title	ECTS	Semester
UOE-2306	English Language II	2.00	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/sem)
2	-	33	17
Description			
<p>The course of scientific English is dealing with providing students with some of the specific language and skills that they are likely to need studying physics, mathematics, biology, chemistry or computer science in English. The course will also focus on English language appropriateness in different contexts, with an emphasis on formal, academic contexts. Therefore, the course aims to develop the communication skills and specialist English language knowledge of science students and professionals, enabling them to communicate more confidently and effectively in their work or study environment.</p>			

Module 17

Code	Course/Module Title	ECTS	Semester
UOE-2304	Computer II	3.00	3
Class (hr/w)	Lab	SSWL (hr/sem)	USSWL (hr/sem)
2	2	63	12
Description			
<p>The student will gain an understanding of the basic principles, structure, grammar, and uses of the C#.NET programming language.</p> <p>Develop the ability and skill to write and compile C#.NET programs, including an understanding of the use of variables, data types, and operators.</p> <p>Learn how to use control structures, including if-else statements, loops (while, for, and do-while), and switch statements to control program flow.</p>			

Module 18

Code	Course/Module Title	ECTS	Semester
UOE-2303	Baath regime crimes in Iraq	2.00	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/sem)
2	-	33	17
Description			
<p>1. Baath regime crimes according to the court law Criminal Antiquity Supreme Council in 2005 AD</p> <p>2-Definition of crime and its sections.</p> <p>3-Crimes Psychological And social And its effects The most prominent violations of the Baathist regime in Iraq.</p> <p>4-Environmental crimes of the Baath regime in Iraq.</p> <p>5-Mass grave crimes.</p> <p>6-Violations of Iraqi laws</p>			

Module 19

Code	Course/Module Title	ECTS	Semester
CE221	Strength of Materials II	6.00	4
Class (hr/w)	Tutor	SSWL (hr/sem)	USSWL (hr/sem)
3	2	78	72
Description			
<p>On completion of the module, the student is expected to be able to: LO#1- Understand the basics of the strength of materials, and the effect of forces, moments, stresses, and strains on materials' behavior. LO#2- applies the principle of static, forces, and equilibrium moments to rigid bodies and 2D structures to determine internal stresses. LO#3- applies the principle of static, forces, and equilibrium moments to rigid bodies and 2D structures to determine internal strains. LO# 4-Discusses and solves problems related to Hooke's law, deformations in axially loaded bars, deformations in a system of axially loaded bars, statically indeterminate axially loaded members, and thermal effects on axial deformation.</p>			

Module 20

Code	Course/Module Title	ECTS	Semester
CE222	Fluid Mechanics II	6.00	4
Class (hr/w)	Lab/ Tutor	SSWL (hr/sem)	USSWL (hr/sem)
2	4	93	57
Description			
<p>The fluid mechanics staff's goal is to give students a thorough understanding of fluid mechanics' foundational ideas, theories, and practical applications. We want to foster a profound understanding of the importance of fluid dynamics in diverse engineering fields and sectors. Our course aims to provide a solid grounding in the fundamentals of fluid mechanics through interesting lectures, lively discussions, and practical experiments. We work hard to help students hone their analytical and problem-solving abilities so they can accurately assess and forecast fluid behavior in real-world situations. We are dedicated to fostering a welcoming and inclusive learning atmosphere that promotes critical thinking, active involvement, and teamwork . By placing a strong emphasis on how fluid mechanics principles may be applied to actual problems, we give students the tools they need to successfully handle challenging engineering issues.</p>			

Module 21

Code	Course/Module Title	ECTS	Semester
CE223	Concrete Technology	4.00	4
Class (hr/w)	Lab	SSWL (hr/sem)	USSWL (hr/sem)
2	2	63	37
Description			
<p>1. When a material with high resistance, defined by good performance, high durability, and fire resistance is required, it is great to introduce students to the most commonly used structural material in the discipline of civil engineering.</p> <p>2. Give students the engineering knowledge and hands-on experience they need to understand the characteristics and behavior of construction materials as well as the key determinants of the quality of construction materials produced in various construction industries.</p> <p>3. Gaining knowledge of how to do laboratory tests on construction materials and their components in accordance with Iraqi and international standards.</p>			

Module 22

Code	Course/Module Title	ECTS	Semester
CE224	Building Construction	4.00	4
Class (hr/w)	Tutor	SSWL (hr/sem)	USSWL (hr/sem)
2	2	63	37
Description			
<p>After successful completion of the module, students should be able to:</p> <ol style="list-style-type: none"> 1. How to use the multiples and sub-multiples of SI units likely to be used in the construction industry 2. The nature and the function of a building and recognize the building as a technology. 3. How to use the various options of excavation and trench support methods. With the primary function of any trench and excavation support method. 4. Explains type of buildings and their usage aims. 5. Explains construction stages. 6. Explain properties of building elements and prepare the drawings. 7. Explains functions of building elements. 8. Explains types and properties of foundations The student prepares foundation plans of buildings. 9. Expresses properties of different wall structures. 			

Module 23

Code	Course/Module Title	ECTS	Semester
CE225	Engineering Economics	4.00	4
Class (hr/w)	Tutor	SSWL (hr/sem)	USSWL (hr/w)
2	2	63	37
Description			
<p>1. Description and role: define engineering economics and describe its role in decision making.</p> <p>2. Engineering economic study approach: understand and identify the steps in an engineering economic study.</p> <p>3. Ethics and economics: identify areas in which economic decisions can present questionable ethics.</p> <p>4. Interest rate: perform calculations for interest rates and rates of return.</p> <p>5. Terms and symbols: identify and use engineering economic terminology and symbols.</p>			

Module 24

Code	Course/Module Title	ECTS	Semester
CE226	Construction Drawing	4.00	4
Class (hr/w)	Lab	SSWL (hr/sem)	USSWL (hr/w)
2	2	63	37
Description			
<p>1) Definition of different structural components.</p> <p>2) Explain different types of buildings.</p> <p>3) Demonstration of different types of foundations and how to draw them by using AutoCAD.</p> <p>4) Demonstration of different types of Beams and columns and how to draw them by using AutoCAD.</p> <p>5) Demonstration of different types of slabs and how to draw them using AutoCAD.</p>			

Module 25

Code	Course/Module Title	ECTS	Semester
UOE-2305	Arabic II	2.00	4
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/w)
2	-	33	17
Description			
<p>This unit addresses the fundamentals of the Arabic language from a linguistic and historical perspective, reviewing its Semitic roots, its development over the ages, and its current status as a global language. It familiarizes the student with the status of Arabic as a language of identity, culture, and knowledge, and explores its phonetic, grammatical, and structural characteristics, in addition to its writing system and rich vocabulary. The unit also highlights the role of Arabic in communication, literary, and intellectual production, and focuses on developing essential language skills (reading, writing, listening, and speaking) within its cultural context.</p>			

Module 26

The Code	Course/Unit Title	European Points System	Semester
CE311	Theory of Structures I	5.00	5
Semester (hour/week)	Tutor	SSWL (hour/semester)	USSWL (hour/week)
2	2	63	62
Description			
<p>This course provides undergraduate civil engineering students with a comprehensive understanding of the analysis of statically determinate and indeterminate structures. Emphasis is placed on the development of analytical skills necessary to evaluate internal forces, deflections, and reactions in structural elements under various loading conditions. The course is structured to build a strong foundation in the fundamental principles of structural analysis and prepare students for advanced topics in structural engineering.</p> <p>Using the 8th Edition of Structural Analysis by R.C. Hibbeler, students will be introduced to classical and modern methods for analyzing beams, trusses, and frames. Topics include support reactions, internal forces, shear and moment diagrams, the method of joints and sections, influence lines, virtual work, energy methods, and matrix analysis of structures. Practical applications, theoretical derivations, and problem-solving are integrated throughout the course.</p>			

Module 27

The Code	Course/Unit Title	ECTS	Semester
CE312	Reinforced Concrete Design I	5.00	5
Semester (hour/week)	Tutor	SSWL (hr/sem)	USSWL (hr/w)
2	2	63	62
Description			
<p>This course introduces undergraduate civil engineering students to the fundamental principles of reinforced concrete design and analysis. Students gain a deep understanding of concrete and steel as structural materials, including their properties, behavior under various types of loads, and interaction within composite structural elements. Through studying the working stress method and the ultimate strength method, students learn to analyze and design reinforced concrete beams under different conditions — whether the sections are uncracked, cracked, under-reinforced, or over-reinforced. They develop the ability to perform structural analysis for both singly and doubly reinforced concrete beams, as well as for T-beams with flanged cross-sections.</p> <p>By the end of the course, students will be able to:</p> <p>Understand the mechanical properties and behavior of concrete and reinforcing steel. Analyze and design elastic and cracked concrete sections using the working stress method. Apply the ultimate strength method for the analysis and design of reinforced concrete beams. Design singly reinforced, doubly reinforced, and tapered concrete beams according to structural requirements. Analyze and design T-beams commonly used in floors and bridges. Develop essential skills for safe, economic, and practical structural design that will prepare them for more advanced concrete design topics. This course builds a strong foundation for students to progress toward more complex structural systems in later studies and professional practice</p>			

Module 28

The Code	Course/Unit Title	ECTS	Semester
CE313	Soil Mechanics I	5.00	5
Semester (hour/week)	Lab./Tutor	SSWL (hr/sem)	USSWL (hr/w)
2	3	78	47
Description			
<p>Course Title: Fundamentals of Soil Mechanics</p> <p>Course Description:</p> <p>This course provides an in-depth introduction to the fundamental principles of soil mechanics, essential for civil engineering, geotechnical design, and environmental applications. Students will explore the physical and mechanical properties of soil, its classification systems, and behavior under various loading and hydraulic conditions.</p>			

Topics Covered:

- Soil Deposits: Formation, types, and geological significance
- Grain Size Distribution: Analysis methods and interpretation of results
- Weight-Volume Relationships: Concepts of density, moisture content, and unit weight
- Soil Consistency: Atterberg limits and their implications for soil behavior
- Soil Classification Systems: Unified Soil Classification System (USCS) and AASHTO methods
- Soil Compaction Principles: Objectives, methods, and factors affecting compaction
- Field Density Calculations: Techniques for measuring in-situ soil density
- Hydraulic Conductivity: Laboratory and field assessment of water movement through soil
- Soil Permeability: Darcy's Law and permeability testing methods
- Stress in Soil Mass: Introduction to total, pore, and effective stresses
- Effective Stress Concept: Terzaghi's principle and its applications
- Vertical Stress and Heaving: Analysis of soil heave and stress distribution due to loading
- Applied Problem Solving: Real-world geotechnical challenges and engineering scenarios
- Interactive Discussions & Critical Thinking
- Final Exam: Comprehensive evaluation of course content

Module 29

The Code	Course/Unit Title	ECTS	Semester
CE314	Num. Eng. analyses	6	5
Semester (hour/week)	Tutor	SSWL (hr/sem)	USSWL (hr/w)
4	2	93	57

Description

This course provides a rigorous exploration of differential equations, linear algebra techniques, and numerical analysis. It equips students with theoretical knowledge and practical skills required to model, solve, and analyze mathematical problems in engineering, physics, and computational sciences. Special attention is given to real-world applications such as beam deflection, dynamic systems, and boundary value problems.

Course Topics Overview

Differential Equations

- First-Order Linear Differential Equations

Introduction to analytic solutions, integrating factors, and modeling simple physical systems.

- Second-Order Linear Differential Equations

Homogeneous and non-homogeneous equations with constant coefficients, physical interpretations like oscillations and electric circuits.

- Cauchy-Euler Equation

Special technique for solving differential equations with variable coefficients.

- Legendre's Differential Equation

Solution using special functions, with applications in physics (e.g., spherical harmonics).

- Laplace Transform

Solving linear differential equations using transform methods, handling initial conditions elegantly.

Fourier Analysis

<ul style="list-style-type: none"> • Fourier Series <p>Representation of periodic functions as infinite sums; convergence and orthogonality.</p> <ul style="list-style-type: none"> • Application: Beam Deflection <p>Use of Fourier Series in modeling deflection in mechanical structures.</p> <p>Linear Algebra Tools</p> <ul style="list-style-type: none"> • Matrices and Matrix Inversion <p>Manipulating systems of equations and understanding matrix properties.</p> <ul style="list-style-type: none"> • Gauss Elimination <p>Systematic technique for solving linear systems.</p> <ul style="list-style-type: none"> • Eigenvalues and Eigenvectors <p>Analyzing stability and system dynamics; diagonalization and modal analysis.</p> <p>Numerical Analysis</p> <ul style="list-style-type: none"> • Interpolation <p>Polynomial and piecewise methods (e.g., Newton, Lagrange) for estimating values.</p> <ul style="list-style-type: none"> • Roots of Equations <p>Techniques like bisection, Newton-Raphson, and secant method.</p> <ul style="list-style-type: none"> • Numerical Integration (Gauss Quadrature) <p>Approximating definite integrals with high accuracy.</p> <p>Initial Value Problems (IVPs)</p> <ul style="list-style-type: none"> • Euler and Modified Euler Methods <p>Step-by-step numerical approaches for solving ODEs.</p> <ul style="list-style-type: none"> • Runge-Kutta Methods and Taylor Series <p>More accurate techniques for solving IVPs, analyzing performance and stability.</p> <p>Boundary Value Problems (BVPs)</p> <ul style="list-style-type: none"> • Finite Difference Method <p>Discretization techniques for solving BVPs.</p> <ul style="list-style-type: none"> • Application: Beam Deflection <p>Modeling and solving structural problems in engineering using numerical grids.</p> <p>Final Exam</p> <p>Comprehensive assessment covering theoretical foundations and practical problem-solving across all topics.</p>

Module 30

The Code	Course/Unit Title	ECTS	Semester
CE315	Environmental Engineering	4	5
Semester (hour/week)	Tutor	SSWL (hr/sem)	USSWL (hr/w)
2	2	63	37
Description			
<p>Course Title: Environmental Engineering and Pollution Control</p> <p>Course Description:</p> <p>This multidisciplinary course introduces students to core principles of ecology and examines the environmental challenges posed by various types of pollution. Through analytical and engineering perspectives, the course explores air, noise, thermal, solid waste, and radioactive pollution—focusing on their sources, impacts, measurement methods, and technologies for</p>			

mitigation. Students will also investigate ecosystem dynamics, sustainable development practices, and the role of renewable energy in minimizing environmental degradation.

Key Topics Covered:

- Ecology Fundamentals:• Principles of ecology
- Ecosystems and ecological balance
- Nutrient cycles and food chains
- Pollution Overview:• Definitions and types of pollution
- Air Pollution:• Emission sources and pollutant types
- Measurement units and control technologies
- Sedimentation chambers, cyclones, filtration, and electrostatic precipitators
- Noise Pollution:• Measurement devices, health effects, and mitigation strategies
- Solid Waste Management:• Types (municipal, agricultural, industrial, hazardous)
- Chemical and physical characteristics
- Collection, transportation, and disposal methods
- Sanitary landfill design and methane gas estimation
- Multi-story building waste systems and compactor calculations
- Thermal Pollution:• Power plant cooling systems
- Evaporative systems, ponds, and cooling towers
- Environmental effects and thermal waste utilization

- Climate Change Impacts:• Effects on human health
- Atmospheric and water consequences of cooling systems
- Radioactive Pollution:• Radiation nature, sources, and measurement units
- Environmental and health impacts
- Sustainable Development:• Renewable energy integration and sustainability practices
- Assessments:• Mid-term and final exams
- Interactive discussions and applied problem-solving

Module 31

The Code	Course/Unit Title	ECTS	Semester
CE316	English Language III	3	5
Semester (hour/week)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/w)
3	-	48	27

Description

Course Title: Practical English for Academic and Professional Communication

Course Description:

This course is designed to build essential English language skills for students across academic and professional contexts. It covers grammar, vocabulary development, reading comprehension, listening practice, and writing strategies. Emphasis is also placed on real-world applications such as composing effective CVs and professional emails. Through workbook exercises, class meetings, and structured assessments, students will enhance both their linguistic competence and practical communication abilities.

Units and Key Topics:

- Unit 1–Unit 9:• Grammar fundamentals and advanced usage
- Vocabulary acquisition and contextual application
- Reading strategies for comprehension and analysis
- Writing development: paragraphs, essays, and responses
- Listening and understanding spoken English in academic settings
- Each unit is followed by a workbook test evaluating these skills
- Professional Writing Modules:• How to create a CV tailored to job or academic applications
- Guided discussion and critique of student CV projects
- Email formats: work-related, academic, personal communication
- How to write subject lines, greetings, and signatures professionally
- Project Discussions:• Exploration of civil engineering projects to integrate technical language with English writing
- Class discussions to encourage applied language use in professional fields
- Assessment & Collaboration:• Mid-term exam covering core linguistic skills
- Class working sessions to develop communication through teamwork
- Preparatory week focused on review and reinforcement
- Final exam to evaluate comprehensive language proficiency

Module 32

The Code	Course/Unit Title	ECTS	Semester
UOE-2305	Arabic Language II	2	5
Semester (hour/week)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/w)
2	0	33	17
Description			
<p>Course objectives</p> <p>.Enabling students to understand the eloquence of the Holy Quran and to appreciate the aesthetics of its language..</p> <p>Training students to use punctuation marks between sentences correctly.</p> <p>To broaden the students' literary horizons of ideas, meanings and moral values..</p> <p>Teaching students how to write correctly according to the basics of spelling, which enables them to write words correctly.</p> <p>Units and Key Topics:</p> <p>Arabic language, definition, origin, function</p> <p>Arabic language and the beginning of blogging</p> <p>Quranic eloquence and Surat Al-Fatihah</p> <p>Basic introduction to grammar</p> <p>Number in Arabic</p> <p>Writing system, ta Marbut and ta open</p> <p>Diminutive morphological system</p>			

Midterm Exam
 For the written system A
 Hamzat al-Wasl and Hamzat al-Qat`
 Quranic eloquence and Surat Al-Kahf
 Synonyms in Arabic
 Poetic purposes in Arabic literature
 Writing system punctuation marks
 Mention and deletion in language
 Final exam

Module 33

The Code	Course/Unit Title	European Points System	Semester
CE321	Theory of Structures II	5.00	6
Semester (hour/week)	Tutor	SSWL (hour/semester)	USSWL (hour/week)
2	2	63	62
Description			
<p>This course provides undergraduate civil engineering students with a comprehensive understanding of the analysis of statically determinate and indeterminate structures. Emphasis is placed on the development of analytical skills necessary to evaluate internal forces, deflections, and reactions in structural elements under various loading conditions. The course is structured to build a strong foundation in the fundamental principles of structural analysis and prepare students for advanced topics in structural engineering. Using the 8th Edition of Structural Analysis by R.C. Hibbeler, students will be introduced to classical and modern methods for analyzing beams, trusses, and frames. Topics include support reactions, internal forces, shear and moment diagrams, the method of joints and sections, influence lines, virtual work, energy methods, and matrix analysis of structures. Practical applications, theoretical derivations, and problem-solving are integrated throughout the course.</p>			

Module 34

The Code	Course/Unit Title	ECTS	Semester
CE322	Reinforced Concrete Design II	5.00	6
Semester (hour/week)	Tutor	SSWL (hr/sem)	USSWL (hr/w)
2	2	63	62
Description			
<p>Course Title: Structural Concrete Design II Course Description: This advanced structural engineering course focuses on the analysis and design of reinforced concrete elements beyond regular section geometries. Students will explore irregular structural sections, shear</p>			

behavior, continuous beams, and the mechanics of slabs and columns under various loading conditions. Emphasis is placed on applying engineering principles to real-world construction challenges using modern design standards and analytical methods.

Course Topics Include:

- Irregular Concrete Sections:• Introduction to non-standard geometries
- Analysis and structural behavior
- Reinforcement detailing and design principles
- Shear Design in Beams:• Fundamentals of shear forces and resistance
- Common failure mechanisms
- Design and problem-solving based on codes of practice
- Continuous Beam Systems:• Structural behavior and support conditions
- Load distribution and moment analysis
- Design methodologies
- One-Way Slabs:• Overview and structural significance
- Analysis of bending and deflection
- Reinforcement layouts and design criteria
- Compression Members (Columns):• Short column behavior under axial loads
- Interaction diagrams for uniaxial loading
- Analysis and design under biaxial loading
- Behavior and design of slender (long) columns
- Evaluation:• Mid-term exam to assess theoretical understanding
- Final exam covering complete design and analysis procedures
- Design case studies and applied assignments

Module 35

The Code	Course/Unit Title	ECTS	Semester
CE323	Soil Mechanics II	5.00	6
Semester (hour/week)	Lab./ Tutor	SSWL (hr/sem)	USSWL (hr/w)
2	3	78	47

Description

Course Title: Advanced Soil Mechanics: Consolidation and Shear Strength

Course Description:

This course delves into the fundamental and advanced concepts of soil behavior under various loading conditions, focusing on consolidation theory and shear strength. Students will explore the compressibility characteristics of soils, settlement analysis, and laboratory testing methods, followed by a thorough examination of shear failure mechanisms and evaluation techniques. Practical problem-solving and engineering design skills are emphasized throughout, preparing students for professional geotechnical applications.

Core Topics:

- Consolidation Theory:• Introduction to consolidation behavior in soils
- Soil compressibility and volume change under stress
- Mechanism of consolidation and pore pressure dissipation
- Computation of consolidation settlement
- Standard consolidation tests and interpretation

- Degree of consolidation and time-rate analysis
- Coefficients of consolidation: C_v , C_c , C_r
- Problem-Based Learning:• Calculation exercises on settlement and time factors
- Application to real-life engineering scenarios
- Shear Strength of Soil:• Definition and significance in stability analysis
- Coulomb shear strength equation
- Mohr-Coulomb failure criterion
- Direct shear test procedures and interpretation
- Triaxial shear test: types (UU, CU, CD) and design implications
- Assessment:• Problem-solving assignments and case studies
- Mid-term exam evaluating theoretical understanding and practical skills

Module 36

The Code	Course/Unit Title	ECTS	Semester
CE324	Water Resource	4	6
Semester (hour/week)	Tutor	SSWL (hr/sem)	USSWL (hr/w)
3	1	63	37

Description

Course Title: Fundamentals of Irrigation and Hydrology

Course Description:

This course provides foundational knowledge in irrigation engineering and hydrological sciences. It emphasizes water resource management, irrigation system design, and the analysis of hydrological processes affecting agricultural and civil infrastructure. Students will explore the physical mechanisms of precipitation, evaporation, streamflow, floods, and groundwater, along with practical approaches for data interpretation and hydraulic modeling.

Course Topics:

- Irrigation Systems:• Introduction to irrigation engineering
- Fundamental structures for irrigation
- Classification and design of irrigation systems (e.g., surface, sprinkler, drip)
- Hydrology Essentials:• Hydrologic cycle and water movement through Earth's systems
- Probability analysis and statistical tools used in hydrology
- Atmospheric and Surface Processes:• Precipitation mechanisms and measurement techniques
- Evaporation processes and influencing factors
- Streamflow behavior and quantification with examples
- Hydrograph Analysis:• Definition, types, and interpretation of hydrographs
- Applications and case examples for flood prediction and stream response
- Flood Analysis and Control:• Flood types, causation, and impact assessment
- Flood calculation methods and peak discharge estimation
- Routing techniques and hydraulic theories for flood management
- Groundwater Fundamentals:• Properties and behavior of subsurface water
- Groundwater flow, recharge zones, and applied examples
- Evaluation:• Mid-term exam covering theory and applied problem-solving

Module 37

The Code	Course/Unit Title	ECTS	Semester
CE325	Estimation and Construction Method	6	6
Semester (hour/week)	Tutor	SSWL (hr/sem)	USSWL (hr/w)
4	2	93	57
Description			
<p>Course Title: Construction Materials and Cost Estimation</p> <p>Course Description: This course provides a comprehensive overview of construction materials and cost estimation methodologies used in civil engineering projects. Students will develop an understanding of the technical and economic aspects of selecting construction materials and equipment, preparing detailed cost estimates, and analyzing productivity. Real-world case studies and practical field visits will enhance students' ability to apply theoretical knowledge in professional scenarios.</p> <p>Course Topics:</p> <ul style="list-style-type: none"> • Foundations of Cost Estimation and Materials Science: <ul style="list-style-type: none"> • Introduction to cost estimation principles • Types of construction materials and their physical/mechanical properties • Technical specifications and material engineering standards • Construction Equipment Analysis: <ul style="list-style-type: none"> • Types of equipment used in construction and their productivity • Engineering fundamentals of construction machinery • Factors influencing equipment selection (cost, site condition, availability) • Material and Equipment Selection Factors: <ul style="list-style-type: none"> • Evaluation techniques for selecting cost-effective materials • Market analysis and price fluctuations • Productivity rates of concrete mixers and other essential tools • Estimation Techniques and Documentation: <ul style="list-style-type: none"> • Quantity takeoff and Bill of Quantities (BoQ) preparation • Cost estimation methods and calculation techniques • Comparative analysis of material costs • Project Implementation and Evaluation: <ul style="list-style-type: none"> • Soil stabilization techniques and material alternatives • Design of concrete formwork and related technical considerations • Tender documents and bidding procedures • Practical applications and site visits • Case studies on cost estimation and material usage in real projects • Assessment: <ul style="list-style-type: none"> • Mid-term exam assessing foundational knowledge • Final exam integrating applied cost analysis and materials selection 			

Module 38

The Code	Course/Unit Title	ECTS	Semester
CE326	Engineering Computer	3	6
Semester (hour/week)	Lab	SSWL (hr/sem)	USSWL (hr/w)
2	2	63	12
Description			
<p>Course Title: Structural Modeling and Data Analysis Tools</p> <p>Course Description: This multidisciplinary course equips students with practical skills in both building information modeling using Revit and statistical data analysis using SPSS. Through hands-on sessions and applied projects, students will gain foundational knowledge in structural modeling and engineering documentation, alongside statistical techniques essential for analyzing and interpreting data in civil engineering and related fields.</p> <p>Module 1: Revit for Structural Modeling</p> <ul style="list-style-type: none"> • Software Introduction:• Overview of Revit interface, project setup, levels, and grids • Structural Elements Modeling:• Columns, walls, beams, slabs, foundations • Coordination of structural components and element relationships • Architectural Components:• Doors, windows, wall openings, and parametric relationships • Documentation and Deliverables:• Generation of plans, sections, schedules • Applied Mini Project:• Creation of a full structural model for review and evaluation • Midterm Exam & Review Session <p>Module 2: Data Analysis Using SPSS</p> <ul style="list-style-type: none"> • Software Orientation:• Navigating the SPSS interface and creating projects • Data Management:• Manual entry, Excel importation, data cleaning, variable coding • Descriptive Analytics:• Frequency tables, histograms, pie charts • Inferential Statistics:• Hypothesis testing using T-tests and Chi-square • Advanced Analysis Tools:• ANOVA (one-way & factorial), correlation studies • Regression Modeling:• Simple and multiple regression techniques • Applied Interpretation:• Translating statistical output into analytical reports • Final Exam 			

Module 39

The Code	Course/Unit Title	ECTS	Semester
UOE-2304	Computer II	2	6
Semester (hour/week)	Lab	SSWL (hr/sem)	USSWL (hr/w)
1	1	33	17
Description			
<p>Course Title: Structural Modeling and Data Analysis Tools</p> <p>1- The student will gain an understanding of the basic principles, structure, grammar, and uses of the C#.NET programming language.</p> <p>2- Develop the ability and skill to write and compile C#.NET programs, including an understanding of the use of variables, data types, and operators.</p> <p>3- Learn how to use control structures, including if-else statements, loops (while, for, and do-while), and switch statements to control program flow.</p> <p>4- Building interfaces and windows and linking them to the programming code.</p> <p>Introduction to computer program and programming languages</p> <p>Other components, helping to organize code and avoid name conflicts.</p> <p>Variable declared within a class to store data.</p> <p>C# Operators (Arithmetic operators, Bitwise operators, logical operators, and Relational operators)</p> <p>Mechanism to read, write, or compute the values of private fields within a class using get and set accesses.</p> <p>A basic building block in C#.NET that defines a data structure, encapsulating data and behavior</p> <p>Mid-term Exam.</p> <p>Function and procedure defined within a class that performs a specific action.</p> <p>Methods to call an object of a class.</p> <p>Heredity and behavior are of another class.</p> <p>Define a set of methods and properties that a class must implement.</p> <p>civil engineering application in C# project</p> <p>civil engineering application in C# project</p> <p>civil engineering application in C# project</p> <p>civil engineering application in C# project</p> <p>Final Exam</p>			

5. Contact

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