



Al Muthanna University

جامعة المثنى

Modules Catalogue

دليل المواد الدراسية

| **2023-2024** |

First Cycle – Bachelor's Degree (B.Sc.)

– Civil Engineering

بكالوريوس - هندسة مدنية

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1. Overview

This catalogue is about the courses (modules) given by the program of Civil Engineering to gain the Bachelor of Science degree. The program delivers (53) Modules with (6000) total student workload hours and 240 total ECTS. The module delivery is based on the Bologna Process.

نظرة عامة

يتناول هذا الدليل المواد الدراسية التي يقدمها برنامج الهندسة المدنية للحصول على درجة بكالوريوس العلوم. يقدم البرنامج (٥٣) مادة دراسية، مع (٦٠٠٠) إجمالي ساعات حمل الطالب و ٢٤٠ إجمالي وحدات أوروبية. يعتمد تقديم المواد الدراسية على عملية بولونيا.

2. Undergraduate Courses 2023-2024

2.1. Module 1: Engineering Mechanics: Statics (CVE111)

Code	Course/Module Title	ECTS	Semester
CVE111	Engineering Mechanics: Statics	5	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	1	63	62

Description

This course aims to provide students with a fundamental understanding of statics in structural systems. It will cover the analysis of forces in one-, two-, and three-dimensional systems. Emphasis will be placed on how these forces mainly fit within different structural systems, including beams, frames, and trusses, in real-world scenarios. Additionally, the course will explore how forces generate moments and examine the effects of these moments on the static equilibrium of structures. Equilibrium, a fundamental concept in civil engineering, will also be taught. Through quizzes and assignments, students will have opportunity to demonstrate their comprehension and mastery of the topics. Their scores, active participation, and understanding will collectively determine their level of knowledge in the subject matter.

2.2. Module 2: Engineering Physics (CVE112)

Code	Course/Module Title	ECTS	Semester
CVE112	Engineering Physics	5	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	1	48	77

Description

Engineering physics is a basic subject in civil engineering. Physical laws are used in calculating the forces affecting buildings and facilities, the amount of tension that bridges may be exposed to, harmonic vibrations, oscillations, tensile forces, elasticity, and all kinds of other concepts that can be used in civil engineering applications.

2.3. Module 3: Mathematics-I (ENG001)

Code	Course/Module Title	ECTS	Semester
ENG001	Mathematics-I	6	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	2	93	57

Description

Mathematics is the science that deals with the logic of shape, quantity, and arrangement. Math is all around us, in everything we do. It is the building block for everything in our daily lives, including mobile devices, computers, software, architecture (ancient and modern), art, money, engineering and even sports. Since the beginning of recorded history, mathematical discovery has been at the forefront of every civilized society, and math has been used by even the most primitive and earliest cultures. The need for math arose because of the increasingly complex demands from societies around the world, which required more advanced mathematical solutions, as outlined by mathematician Raymond L. Wilder in his book "Evolution of Mathematical Concepts" The more complex a society, the more complex the mathematical needs. Primitive tribes needed little more than the ability to count, but also used math to calculate the position of the sun and the physics of hunting. "All the records — anthropological and historical — show that counting and, ultimately, numeral systems as a device for counting form the inception of the mathematical element in all cultures,". After successful completion of the module, students should be able to: 1. Work with functions represented in various ways: graphical, numerical, analytical, or verbal. They should understand the connections among these representations. The functions include linear, polynomial, absolute value, rational, exponential, logarithmic, trigonometric, inverse trigonometric, hyperbolic, inverse hyperbolic, and piecewise defined functions. 2. Define and apply the concepts of limits and continuity to the mentioned functions and study them graphically and analytically. 3. Understand the meaning of the derivative in terms of a rate of change and local linear approximation and should be able to use derivatives to solve a variety of problems. 4. Understand the meaning of the definite integral both as a limit of Riemann sums as the net accumulation of change and should be able to use integrals to solve a variety of problems. 5. Understand the relationship between the derivative and the definite integral as expressed in both parts of the Fundamental Theorem of Calculus.

2.4. Module 4: Workshops (ENG002)

Code	Course/Module Title	ECTS	Semester
ENG002	Workshops	4	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
1	2	45	55

Description

Workshop is the core of learning about different Materials, equipment, tools and manufacturing practices that are observed in different manufacturing functions and operations. Workshop is also of prime importance when you want to gather about the practical knowledge. What is the role of an

engineer in workshop? Overview Take complete responsibility for specific workshop jobs. Main activities will be dismantling, cleaning, inspecting, repairing, assembling and testing diesel engines spares and assemblies. Will need a “hands-on” approach to other mechanical engineering projects. What is the importance of learning workshop basics for an engineer? The workshop experiences would help to build the understanding of the complexity of the industrial job, along with time and skills requirements of the job. Workshop curricula build the hands on experiences which would help to learn manufacturing processes and production technology courses in successive semesters. What are the types of engineering workshop? The Engineering Workshops consist of the Machine Shop (metal work), the Fitting Shop, the Foundry, the Smithy, the Welding shop, the Carpentry Shop and the Motor Vehicle Repair Unit and Service Facility.

2.5. Module 5: Engineering Drawing-I (ENG003)

Code	Course/Module Title	ECTS	Semester
ENG003	Engineering Drawing-I	5	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
1	2	48	77

Description

The Engineering Drawing course is a five-hours lab course that meets twice per week for two and three hours. This is a required class for all first year Civil Engineering. The class time is divided between manual and CAD instruction. The sketching is employed to teach concepts and a limited number of tools are used when constructing manual drawings (e.g., triangles, scales, compasses, dividers, and mechanical pencils). Autodesk AutoCAD 2016 was used as the CAD software package. Topics covered in the course include lettering, sketching, orthographic drawings, isometric, dimensioning, and section views.

2.6. Module 6: Computer I (UNI004)

Code	Course/Module Title	ECTS	Semester
UNI004	Computer I	3	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	12

Description

For hardware, a module is an assembly of parts designed to be added and removed from a larger system easily. An example of a hardware module is a stick of RAM. Most modules are not functional on their own. They need to be connected to a larger system or be part of a system made up of several modules. The concept of modularity or being made up of modules is common in computer hardware. A modular system has many advantages allowing for ease of repair, upgrade, and extension of functionality. The various modules can be swapped out as needed. Standardization of hardware as interconnects enables several vendors to produce modules creating better choice for consumers.

2.7. Module 7: Democracy and Human Rights (UNI006)

Code	Course/Module Title	ECTS	Semester
UNI006	Democracy and Human Rights	2	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	-	33	17
Description			
تعريف شامل بمركز حقوق الإنسان ابتداء من جذور نشأتها والتطورات التي شهدتها هذه الحقوق الإنسانية عبر العصور والمجتمعات البشرية وإسهام الشرائع السماوية والأديان والحضارات في رفدها بالقيم والمثل مروراً بمختلف العصور. تفعيل العقل والتفكير والإبداع والحرص على المشاركة الديمقراطية بكل تفاصيلها ومبادئ العدالة الاجتماعية.			

2.8. Module 8: Engineering Mechanics: Dynamics (CVE121)

Code	Course/Module Title	ECTS	Semester
CVE121	Engineering Mechanics: Dynamics	5	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	1	60	65
Description			
This course aims to provide students with a fundamental understanding of dynamic in structural systems. Friction is the first topic that covers the mechanism of the movement of the contacted surfaces. Subsequently, the course will cover the centroid of geometric shapes in two- and three-dimensional systems. Furthermore, the course emphasizes the area moments of inertias within different geometric shapes, including regular and irregular shapes. This will make students able to choose the right sections of structural members in real-world scenarios. Moreover, the course will explore the basic concept of dynamic and how the equation of motion will be generated and examine the effects of different parameters on the function. Quizzes and assignments are the main measures in the class. By these measures, students will have opportunity to demonstrate their comprehension and mastery of the aforementioned topics. Their scores, active participation, and understanding will collectively determine their level of knowledge in the subject matter.			

2.9. Module 9: Building Materials (CVE122)

Code	Course/Module Title	ECTS	Semester
CVE122	Building Materials	5	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	2	75	50

Description
This course is designed for students to understand compositions, engineering behaviors, and design methods of various civil engineering materials, including Clay Bricks and their types, Tiles, Masonry Stone, Mortar and Binders, Gypsum Mortar, Lime Mortar, Wood, and Reinforcement steel ... etc., At the end of this course, the students should have learned about the various materials, both conventional and modern, that are commonly used in civil engineering construction. Further, the student should be able to appreciate the criteria for the choice of the appropriate materials and the various tests for quality control in the use of these materials, and the evaluation of material performance under applied loads in engineering applications, Physical Properties of Building Materials, this course includes the study of the variability of Building materials, their properties, and uses.

2.10. Module 10: Chemistry (CVE123)

Code	Course/Module Title	ECTS	Semester
CVE123	Chemistry	5	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	60	65

Description
Analytical Chemistry: Everything is made of chemicals. Analytical chemistry determines what and how much. In other words, analytical chemistry is concerned with the separation, identification, and determination of the relative amounts of the components making up a sample. Analytical chemistry is concerned with the chemical characterization of matter and the answer to two important questions what it (qualitative) is and how much is it (quantitative). Qualitative analysis: An analysis in which we determine the identity of the constituent species (the elements and compounds) in a sample. Quantitative analysis: An analysis in which we determine how much of a constituent species is present in a sample. Organic chemistry: This course was designed in a way such that you learn that organic chemistry is that A science directly related to chemical engineering concerned with the study of all organic compounds, their chemical and physical properties, methods of preparation and their interactions. the organic compounds are classified, and each compound is studied in detail starting with the aliphatic compounds and what they include of alkanes, alkynes and alkynes, the properties of each one of them, their composition, formula, method of naming, methods of preparation and their chemical interactions.

2.11. Module 11: Engineering Geology (CVE124)

Code	Course/Module Title	ECTS	Semester
CVE124	Engineering Geology	4	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2		30	70

Description

Engineering Geology is a foundational module in the civil engineering department that merges geological sciences with engineering to provide a comprehensive understanding of geological principles and how they affect engineering practices. This course aims to equip students with the knowledge to assess geological factors that significantly influence the design, construction, and maintenance of engineering structures and projects.

2.12. Module 12: Engineering Drawing-II (CVE125)

Code	Course/Module Title	ECTS	Semester
CVE125	Engineering Drawing-II	5	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
1	4	75	50

Description

The Engineering Drawing course is a five-hours lab course that meets twice per week for two and three hours. This is a required class for all first year Civil Engineering. The class time is divided between manual and CAD instruction. The sketching is employed to teach concepts and a limited number of tools are used when constructing manual drawings (e.g., triangles, scales, compasses, dividers, and mechanical pencils). Autodesk AutoCAD 2016 was used as the CAD software package. Topics covered in the course include lettering, sketching, orthographic drawings, isometric, dimensioning, and section views.

2.13. Module 13: Engineering Statistics (ENG004)

Code	Course/Module Title	ECTS	Semester
ENG004	Engineering Statistics	4	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	1	45	55

Description

Basic concept :Description and Classification of Data, Frequency Distribution (Cumulative Frequency Distribution, Frequency Histogram, Frequency Polygon, Frequency Curve and Relative Frequency), Measurements of Central Tendency (Mathematical Mean, Mode, Geometric Mean and Harmonic Mean). Measures of Dispersion (Standard Deviation, Variance, Coefficient of Variance, Range and Mean Absolute Deviation), Theory of Probability, Permutation and Combination, Statistical Probability Distributions (Poisson, Binomial and Normal), Sampling and Testing of Significant Chi-Square Distribution and Linear Correlation and regression.

2.14. Module 14: English Language I (UNI001)

Code	Course/Module Title	ECTS	Semester
UNI001	English Language I	2	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	-	30	20

Description

This module covers the book of Headway for 1st year college level (grammars, pronunciation, and selected paragraphs in civil engineering) to develop the basic language skills which helps students acquire and improve their English skills at a beginner level. This includes building vocabulary, improving pronunciation, and developing grammatical understanding.

2.15. Module 15: Strength of Materials I(CVE211)

Code	Course/Module Title	ECTS	Semester
CVE211	Strength of Materials I	5	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	1	60	65

Description

Introduction, Stress and Strain, Hook's Law, Riveted Connections, Thin Walled Pressure Vessels, Axially Loaded Members, Equations of Equilibrium and Compatibility, Thermal Strains, Transformation of Stresses and Strains, Principal Stresses, Torsion, Axial Force.

2.16. Module 16: Engineering Surveying I (CVE212)

Code	Course/Module Title	ECTS	Semester
CVE212	Engineering Surveying I	5	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	75	50

Description

The focus will be on the surveying aspect that involves the theory of surveying applied to construction projects in civil engineering through series of lectures, tutorials and practical. Firstly, general introduction of surveying and know various types of surveying. Students enrolled here should be able to define types of surveying techniques, classifying errors in surveying and how to manage them. They also should be able to Understand linear measurements e.g., measuring distances, setting-out right

angles, and overcoming obstacles. Also, be able to differentiate between heights, datum and benchmarks (BM), know and understand the use of the leveling equipment and understanding the field procedures for leveling. Part of focus will be given to Understand profile leveling procedure as well as estimating areas of different types of cross sections, irregular shapes, and polygons. Estimation of earthwork volume will be also covered in this unit.

2.17. Module 17: Concrete Technology I (CVE213)

Code	Course/Module Title	ECTS	Semester
CVE213	Concrete Technology I	5	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	60	65

Description

This course is designed to provide students with a thorough understanding of concrete, one of the most widely used construction materials, from its fundamental components to its behavior under various conditions. Students learn about the physical and mechanical properties of concrete, methods for testing its strength and durability, and the impact of environmental factors on its performance. The module also introduces advanced concrete materials and sustainable practices in concrete construction. Through theoretical knowledge and hands-on laboratory work, the course prepares students for the challenges of using concrete in modern infrastructure projects, ensuring they have the skills to innovate and apply concrete technology effectively in their future careers.

2.18. Module 18: Fluid Mechanics (CVE214)

Code	Course/Module Title	ECTS	Semester
CVE214	Fluid Mechanics	5	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	2	75	50

Description

Fluid mechanics is the branch of physics concerned with the mechanics of fluids (liquids, gases, and plasmas) and the forces on them.[1]:3 It has applications in a wide range of disciplines, including mechanical, aerospace, civil, chemical and biomedical engineering, geophysics, oceanography, meteorology, astrophysics, and biology. It can be divided into fluid statics, the study of fluids at rest; and fluid dynamics, the study of the effect of forces on fluid motion.[1]:3 It is a branch of continuum mechanics, a subject which models matter without using the information that it is made out of atoms; that is, it models matter from a macroscopic viewpoint rather than from microscopic. Fluid mechanics, especially fluid dynamics, is an active field of research, typically mathematically complex. Many problems are partly or wholly unsolved and are best addressed by numerical methods, typically using computers. A modern discipline, called computational fluid dynamics (CFD), is devoted to this approach.[2] Particle image velocimetry, an experimental method for visualizing and analyzing fluid

flow, also takes advantage of the highly visual nature of fluid flow.

2.19. Module 19: Mathematics II (ENG005)

Code	Course/Module Title	ECTS	Semester
ENG005	Mathematics II	5	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	2	90	35
Description			
Revision of basic algebraic techniques: substitution, simplification, factorization, indices, evaluation and transposition of formulae, fractions and partial fractions. Linear and quadratic equations, linear simultaneous equations. Revision of elementary coordinate geometry: Distance between two points. Trigonometry: Angular measurement (radians and degrees, minutes and seconds), Sine and cosine rules. Trigonometric identities and equations. Applications: Surveying; Forces Exponential function: Properties and graph. Natural logarithm as inverse of exponential function, graph and properties. Definitions and calculation of hyperbolic functions including inverse functions. Revision of differential calculus of one variable: Gradient of curve, derivatives of standard functions, linearity, derivatives of composite functions, products and quotients. Applications: Stationary points. Rates of change. Revision of integral calculus as inverse of differentiation. Standard integrals, linearity, integration of composite functions. Numerical integration. Applications: Centroids Functions: Notation, types of function, composite and inverse, graphs. Complex numbers: Complex arithmetic, complex conjugate, Argand diagram. Rectangular, polar forms. Magnitude and phase. Basic use of Euler's formula. Roots: Numerical techniques, including the Newton-Raphson method. Applications: Solving cubic equations. Basic vector algebra including Cartesian components and products. Differentiation of vectors. Applications: Forces Basic matrix manipulation including the inverse matrix. Applications: Solution of systems of linear equations. 1st order differential equations.			

2.20. Module 20: Computer II (UNI005)

Code	Course/Module Title	ECTS	Semester
UNI005	Computer II	3	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	60	15
Description			
This course is outcome base learning. It is to test achievement of learning outcomes and changing upon. The instructor will focus on materials those expanding students' critical thinking skills. The course was designed in a way such that students are to Employment of computer programming in civil engineering service applications professional work and personal life even when they are not willing to become programming engineer. The course will give the basics of the field and how to obtain additional information as engineers require it in their careers and will give them good opportunity to understand			

the methods of solving civil engineer problems by using computer programming and consider that in their work. Quizzes will be based on the material covered in class. This material comes from a variety of sources and may go beyond the information covered in the text. Quizzes and final exam will typically consist of both quantitative and qualitative questions. In all quizzes or final exam a student will need to show all work on quantitative problems. Group assignments and reports will be open book, note and neighbor. The quizzes will be closed book, notes and neighbor. Assignments that cannot be read or are not presented in a professional engineering style will not receive credit. Final exam will be comprehensive. Plagiarism is a serious offense and will not be tolerated. Plagiarism will result in a zero for the assignment. Due dates will be given in class. Late papers may be accepted but will be docked 10% per day, including weekends and starting immediately following class. Students with excused absences will be given a reasonable amount of time to catch up on their work with no penalty. No assignments will be accepted after the solution been returned or posted, whichever occurs first.

2.21. Module 21: Arabic (UNI003)

Code	Course/Module Title	ECTS	Semester
UNI003	Arabic Language	2	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	-	30	20
Description			
يتضمن هذا الدرس مراجعة الكلمة واقسامها، والمعرب والمبني، وأفعال الماضي والمضارع والامر واحوالها ومراجعة العلامات الفرعية التي تلحق بالافعال والاسماء وهمزات القطع والوصل، الهمزة المتوسطة، وعلامات الترقيم، الجمل الاسمية والفعلية و التاء المربوطة والتاء المفتوحة و الحروف الناسخة والافعال اللازمة والمتعدية وأدوات الجر و نماذج من النصوص العربية وأخطاء شائعة في الكتابة بالعربية وأمثلة تطبيقية لكتابة التقارير بالعربية.			

2.22. Module 22: Strength of Materials II (CVE221)

Code	Course/Module Title	ECTS	Semester
CVE221	Strength of Materials II	5	4
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	1	60	65
Description			
Shear, and Bending Moment Diagrams, Bending Stresses, Composite Beams, Shearing Stresses in Beams, Shear Center and Shear Flow, Compound Stresses, Deflection of Beams, Direct Integration Method, Moment-Area Method, Buckling of Columns.			

2.23. Module 23: Engineering Surveying II (CVE222)

Code	Course/Module Title	ECTS	Semester
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CVE222	Engineering Surveying II	5	4
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	75	50
Description			
The focus will be on the surveying aspect that involves the theory of surveying applied to construction projects in civil engineering through series of lectures, tutorials and practical. Begin with general introduction on Directions and angles systems to open the window on coordinates systems. Total station, theodolite, and GPS will be the most suitable to be familiar with and work on. Students should be able to record (book) angular and distance measurements in a manner that can be understood by other professionals. Additionally, know how to establish horizontal controls i.e., known positions (Easting and Northings). Traversing, closing errors, and adjustment will be provided. Students should be able to appreciate the geometric properties of circular and vertical curves as well as setting out procedure. Modern software and techniques will be covered at the end.			

2.24. Module 24: Concrete Technology II (CVE223)

Code	Course/Module Title	ECTS	Semester
CVE223	Concrete Technology II	5	4
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	60	65
Description			
This course is designed to provide students with a thorough understanding of concrete, one of the most widely used construction materials, from its fundamental components to its behavior under various conditions. Students learn about the physical and mechanical properties of concrete, methods for testing its strength and durability, and the impact of environmental factors on its performance. The module also introduces advanced concrete materials and sustainable practices in concrete construction. Through theoretical knowledge and hands-on laboratory work, the course prepares students for the challenges of using concrete in modern infrastructure projects, ensuring they have the skills to innovate and apply concrete technology effectively in their future careers.			

2.25. Module 25: Irrigation and Drainage Engineering (CVE224)

Code	Course/Module Title	ECTS	Semester
CVE224	Irrigation and Drainage Engineering	5	4
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	1	60	65

Description
Irrigation and Drainage Engineering" is a critical module in civil engineering focused on the design and management of systems to distribute water for agriculture and control water accumulation to prevent soil degradation. It encompasses the study of soil-water-plant relationships, types of irrigation methods (such as surface, sprinkler, and drip irrigation), and the design principles of drainage systems to remove excess water, enhancing land productivity and sustainability

2.26. Module 26: Buildings Construction (CVE225)

Code	Course/Module Title	ECTS	Semester
CVE225	Buildings Construction	6	4
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	3	90	60
Description			
تهدف المادة الى تعليم الطلبة الطرق والمواد المستخدمة واهم المعلومات الاساسية التي يحتاجها الطالب في كلية الهندسة في موضوع انشاء المباني والوسائل المستخدمة والاليات المتبعة في كل جزء من الابنية والتمهيد لاستيعاب الكثير من المعلومات التي لها علاقة مع دراساته المقبلة وممارسته المهنة بعد ذلك.			

2.27. Module 27: English Language II (UNI002)

Code	Course/Module Title	ECTS	Semester
UNI002	English Language II	2	4
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	-	30	20
Description			
This module covers the book of Headway for second year college level (grammars, pronunciation, and selected paragraphs in civil engineering) to enhance students' overall language proficiency in English and to help students build a solid foundation in grammar, vocabulary, and pronunciation.			

2.28. Module 28: Baath Crimes (UNI0010)

Code	Course/Module Title	ECTS	Semester
UNI0010	Irrigation and Drainage Engineering	2	4
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)

2	-	30	20
Description			

2.29. Module 29: Traffic Engineering I (CVE311)

Code	Course/Module Title	ECTS	Semester
CVE311	Traffic Engineering I	4	5
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	60	40
Description			
Traffic Engineering is the branch of engineering which focuses on identifying the road characteristics and traffic components. The main characteristics of traffic are of concern to human beings as road users and vehicles. Therefore, vehicle characteristics will be considered first including forces affecting vehicle movement and a required sight distance for stopping and passing conditions. As well, traffic flow characteristics such as traffic fluctuation and calculation of average annual daily traffic are involved. Spot speed studies will be delivered to students in this course. Strategies of traffic calming that restore or create a balance between the various users of public highway space will be described. Design of horizontal and vertical alignments is well described based on previous delivered aspects of traffic flow and speeds.			

2.30. Module 30: Theory of Structures I (CVE312)

Code	Course/Module Title	ECTS	Semester
CVE312	Theory of Structures I	4	5
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	1	60	40
Description			
In this course, the student will be provided by the knowledge required for determinate structures analysis using different approaches. This will help him to improve his basic skills in structural analysis. The topics include types of loads Classification of structures; loads and structural design. Geometric stability and determinacy. Analysis of statically determinate frames: Computations of reactions, axial force, shear force and bending moment diagrams. Deformation of beams, frames and trusses using virtual work method. Influence lines for beams.			

2.31. Module 31: Soil Mechanics I (CVE313)

Code	Course/Module Title	ECTS	Semester
CVE313	Soil Mechanics I	5	5
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	75	50

Description

This course gives good opportunity for students to understand the methods of solving geotechnical problems and consider that in their structural work. The main subjects of this semester include understanding Composition of Soil and Description of soil. Particle size distribution, Plasticity and Structure of Soil, Classification of soil according to different system as unified, AASHTO, textural Classification, Compaction of soil including type of compaction, field compaction and laboratory compaction Also the this course discusses stress Distribution and in situ stress , Stresses in a Soil Mass which is including Point load, Line load, Uniformly distributed vertical strip load, Linearly increasing vertical loading on a strip, embankment type of loading, Uniformly loaded circular area and Uniformly loaded rectangular area, Permeability and type of hydraulic conductivity test.

2.32. Module 32: Reinforced Concrete I (CVE314)

Code	Course/Module Title	ECTS	Semester
CVE314	Reinforced Concrete I	5	5
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	1	60	65

Description

This course was designed in a way such that you learn to take analysis and design considerations into account in your professional work and personal life even when you are not willing to become structural engineer. This course will give the basics of the field and how to obtain additional information as you require it in your careers and will give you good opportunity to understand the methods of solving conventional structural problems.

2.33. Module 33 Engineering economy and Project Management (CVE315)

Code	Course/Module Title	ECTS	Semester
CVE315	Engineering economy and Project Management	6	5
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	1	60	90

Description
The students are prepared to learn the fundamental information of engineering economy including the financial operation and the relationship between time and money. It also covered the depreciation theory and the alternatives. Moreover, it covers the fundamental information of engineering management and construction management including different types of contracts and the time-cost-quality relationship. It also covers different methods of time estimation and cost estimation. The course is designed to prepare the student to deal with financial issues during the construction stages and provide him with knowledge related to construction management.

2.34. Module 34: Engineering Analysis and Numerical Methods (CVE316)

Code	Course/Module Title	ECTS	Semester
CVE316	Engineering Analysis and Numerical Methods	6	5
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	75	75
Description			
Indicative content includes the following. Introduction to the concept of second order differential equations and its relevance to civil engineering, solving the second order differential equations in very different ways, and solving their applications. Extracting the most important features of a dataset by identifying the directions of maximum variation in the data using Eigenvalues and eigenvectors. Estimating the area under curves through the use of numerical integration. B.V.P can help you in reducing the number of test cases needed to cover the input domain, as you only need to test a few values at each boundary instead of testing every possible value. This can save your time and resources, as well as make your test cases more manageable and maintainable. Converting some complex equations to other periodic functions using Fourier series.			

2.35. Module 35: Traffic Engineering II (CVE321)

Code	Course/Module Title	ECTS	Semester
CVE321	Traffic Engineering II	4	6
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	60	40
Description			
This course introduces Traffic Engineering II which focuses on the study and improvement of traffic performance on road networks and terminals. It aims to achieve efficient, free and rapid flow of traffic. In addition to that, traffic accident and causalities should be eliminated as much as possible by applying safety measures that achieve better level of service. Estimation of the level of service is based on			

determining road capacity and the fundamental relationships of speed – flow – density. The procedures used in traffic engineering are based on scientific and engineering disciplines. Design requirements of signalized junctions and roundabouts are included regulation and control, planning and geometric design. The main characteristics of parking and public transport are of concern to the traffic engineering requirements and road management.

2.36. Module 36: Theory of Structures II (CVE322)

Code	Course/Module Title	ECTS	Semester
CVE322	Theory of Structures II	5	6
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	1	60	65
Description			
This course will help the students to comprehensively understand the methods in which statically indeterminate structures could be analyzed. The course starts with showing the differences between determinate and indeterminate structures followed by explaining the procedures of analysis using different methods. The first method is consistent deformation method which can be considered a general method which enables the students to analyze beams, frames and trusses. Then, the student will have an appropriate knowledge on how to analyze beams and frame using slope deflection and moment distribution methods. After that, stiffness matrix method is presented for different structures. Finally, some approximate methods to analysis indeterminate structures are introduced for beams, frames and trusses.			

2.37. Module 37: : Soil Mechanics II (CVE323)

Code	Course/Module Title	ECTS	Semester
CVE323	Soil Mechanics II	5	6
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	75	50
Description			
The second semester of soil mechanic is including subjects which are complementary to the first course. The main subjects of this semester include understanding Seepage of soil, Laplace's Equation of Continuity , Continuity Equation for Solution of Simple Flow Problems, Flow Nets, Mathematical Solution for Seepage . Compressibility of Soil, elastic settlement, consolidation settlement, Calculation of Settlement from One-Dimensional Primary Consolidation, Secondary Consolidation Settlement, Time Rate of Consolidation and Pre-compression .Shear Strength of Soil, Normal and Shear Stresses on a Plane, Mohr–Coulomb Failure Criterion, Inclination of the Plane of Failure Caused by Shear and			

Laboratory test for Determination of Shear Strength Parameters using many laboratory tests. The main laboratory tests for shear strength are direct shear, unconfined compressive test and tri axial shear test.

2.38. Module 38: Reinforced Concrete II (CVE324)

Code	Course/Module Title	ECTS	Semester
CVE324	Reinforced Concrete II	5	6
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	1	60	65
Description			
This course was designed in a way such that you learn to take analysis and design considerations into account in your professional work and personal life even when you are not willing to become structural engineer. This course will give the basics of the field and how to obtain additional information as you require it in your careers and will give you good opportunity to understand the methods of solving conventional structural problems.			

2.39. Module 39: Hydrology (CVE325)

Code	Course/Module Title	ECTS	Semester
CVE325	Hydrology	6	6
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	1	60	90
Description			
Hydrological engineering is an engineering specialty that focuses on water resources. Hydrology is the study of the movement, distribution, and quality of water on Earth, as well as the most important components of the hydrologic cycle such as (precipitation (snow and rain), evaporation, soil- and groundwater, runoff in streams and rivers), and water resource and environmental watershed sustainability. Hydrological engineering is chiefly concerned with the flow and storage of water, principally water and sewage. It is the study of the properties, distribution, and circulation of water on the surface of the land, in the soil and underlying rocks, and in the atmosphere. Hydrological engineering also focuses on preventing floods and lessening the effects of floods, droughts and other natural disasters.			

2.40. Module 40: Methods of Construction and Engineering Estimation (CVE 326)

Code	Course/Module Title	ECTS	Semester
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CVE326	Methods of Construction and Engineering Estimation	5	6
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/w)
3	1	60	65
Description			
The Estimation and Construction Methods module provides students with a comprehensive understanding of the principles, techniques, and processes involved in construction project estimation and management. Throughout the module, students will learn how to analyse project requirements, and develop accurate cost estimates. Students will gain insights into the factors influencing construction costs, including materials, labour, equipment, and overhead expenses. Throughout the module, students will have the opportunity to engage in practical exercises, case studies, and group projects, allowing them to apply theoretical concepts to real-world construction scenarios. They will develop skills in quantity take-off, cost estimation, and construction project management tools. Upon completion of this module, students will have a strong foundation in construction estimation and management, enabling them to contribute to the successful planning, execution, and control of construction projects in various engineering and construction contexts.			

2.41. Module 41: Design of steel structures I (CVE411)

Code	Course/Module Title	ECTS	Semester
CVE411	Design of steel structures I	5	7
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/w)
3	1	60	65
Description			
The aim of this course is to provide students with a thorough understanding of the iterative nature of design and the fundamental principles on which the analyses are based. The course covers the design and analysis of a steel tension and compression members for local and global buckling as well as material failure. Wherever possible, analyses are based on fundamental principles which are globally relevant and are assessed through quizzes and/or exams. The course also includes an open-ended design topic to develop the students' ability as an engineer and problem solver and which is assessed through the submission of a report. Topics are taken from: steel tension members; steel columns.			

2.42. Module 42: Foundation Engineering I (CVE412)

Code	Course/Module Title	ECTS	Semester
CVE412	Foundation Engineering I	5	7

Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/w)
3	1	60	65
Description			
This course is designed to enable the student to understand the geotechnical applications and structures, so that he can connect and correlate all scientific principles and theories that the student can design and carry out the soil investigation and then to produce a report of soil investigation with recommendations for design and construction of foundation. In addition, the student be able to determine the bearing capacity of soil for shallow foundation and calculating the settlement of civil structures. This is for both homogeneous and non-homogeneous soil. The loadings may be taken into considerations are both concentric and eccentric. The level of underground water will be considered to show its effect on bearing capacity and the settlement of the soil. in addition to that the course will furnish the student with the data and information for executing the underground structures safely and economically.			

2.43. Module 43: Highways Engineering I (CVE413)

Code	Course/Module Title	ECTS	Semester
CVE413	Highways Engineering I	6	7
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/w)
2	3	75	75
Description			
Highway engineering subject is a two-course sequence that covers the fundamental elements of highway engineering. Highway engineering is the application of technological and scientific principles to the planning, functional design, operation and management of highway network in order to provide for the safe, rapid, comfortable, convenient, economical, and environmentally compatible movement of people and goods. Also, the course includes the geometric design, cross section elements, earthwork, paving material properties, structural design of flexible and rigid pavements and maintenance program that can be adopted on highway system. Quizzes will be based on the material covered in class. This material comes from a variety of sources and may go beyond the information covered in the text. Quizzes and the final exam will typically consist of both quantitative and qualitative questions. In all quizzes or final exam, a student will need to show all work on quantitative problems. Pay attention to significant figures. Group assignments will be open book, note and neighbor. The quizzes will be closed book, notes and neighbor. Assignments that cannot be read or are not presented in a professional engineering style will not receive credit. Final exam will be comprehensive. Extra work will be given to individual students to improve grades when possible. I will provide you with your overall grade after each exam. All graded work will be used as a baseline for assigning grades. The following rating will be used for grading.			

2.44. Module 44: Sanitary and Environmental Engineering I (CVE414)

Code	Course/Module Title	ECTS	Semester
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CVE414	Sanitary and Environmental Engineering I	6	7
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/w)
2	3	75	75
Description			
Indicative content includes the following: Introduction to concept of sustainability and its relevance to civil engineering, Life Cycle Assessment [5 hrs]. Drinking Water Treatment (Water Pollution, Water characteristics, Laws and Regulations, Source Selection) [10 hrs]. Conventional Drinking Water Treatment Processes, Hardness Softening Including Lime Soda Ash Softening and Ion Exchange Softening), Coagulation, Flocculation, Sedimentation, Filtration and Disinfection [40 hrs]. Special Treatment Processes, Membrane Technology, Ultra-filtration [10 hrs]. Pipes, Designing Distribution Systems, Contamination Prevention in Distribution Systems, Runoff Discharge [20 hrs]. Solid Waste Management, Characteristics, Collection Systems, Treatment Hierarchy, Reduce, Reuse, Recycle, Remanufacturing, Refuse [10 hrs]. Revision problem classes [5 hrs].			

2.45. Module 45: Design of concrete structures (CVE415)

Code	Course/Module Title	ECTS	Semester
CVE415	Design of concrete structures	5	7
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/w)
3	1	60	65
Description			
Indicative content includes the following. Introduction to concept of reinforced concrete and its relevance to civil engineering, solving problems [5 hrs]. design of slab using DDM [10 hrs]. design of prestress concrete [40 hrs]. design of reinforced concrete [10 hrs] yiled line theory [5 hrs] and stair design [5 hrs] Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students. This course generally deals with the concept of structural engineering design and analysis depending on the previous courses which are studied in third class that study the beam in working and ultimate method, slab and short column. So this course will complete this study by the long column as analysis and design with a review for the short column and study the prestress concrete which is considered as new and very important subject for the civil engineers.			

2.46. Module 46: Engineering Project (ENG006)

Code	Course/Module Title	ECTS	Semester
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ENG006	Engineering Project	3	7
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/w)
2		30	45
Description			

2.47. Module 47: Design of steel structures II (CVE421)

Code	Course/Module Title	ECTS	Semester
CVE421	Design of steel structures II	5	8
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/w)
3	1	60	65
Description			
The aim of this course is to provide students with a thorough understanding of the iterative nature of design and the fundamental principles on which the analyses are based. The course covers the design and analysis of a steel frame structure for local and global buckling as well as material failure. Wherever possible, analyses are based on fundamental principles which are globally relevant and are assessed through quizzes and/or exams. The course also includes an open ended design topic to develop the students' ability as an engineer and problem solver and which is assessed through the submission of a report. Topics are taken from: steel beams; design of bolted and welded connections and beam-columns.			

2.48. Module 48: Foundation Engineering II (CVE422)

Code	Course/Module Title	ECTS	Semester
CVE422	Foundation Engineering II	5	8
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/w)
3	1	60	65
Description			
This module was designed in a way such that the student be able to analysis and design shallow foundation in both concepts: geotechnical and structural in correlation to the requirements of ACI-318-19. Design of deep foundation along with determining bearing capacity of piles foundation. Design of piles group should be considered. The student be able to know methods of construction of piles			

foundation, to calculate the settlement of piles foundation, analyze and design of retaining walls, and analysis and determination of factor of safety for slope stability. In addition to consider the effect of underground water on the method for construction of piles and stability of retaining earth structures as well as for stability of slope.

2.49. Module 49: Highways Engineering II (CVE 423)

Code	Course/Module Title	ECTS	Semester
CVE423	Highways Engineering II	5	8
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/w)
2	3	75	50

Description

Highway engineering subject is a two-course sequence that covers the fundamental elements of highway engineering. Highway engineering is the application of technological and scientific principles to the planning, functional design, operation and management of highway network in order to provide for the safe, rapid, comfortable, convenient, economical, and environmentally compatible movement of people and goods. Also, the course includes the geometric design, cross section elements, earthwork, paving material properties, structural design of flexible and rigid pavements and maintenance program that can be adopted on highway system. Quizzes will be based on the material covered in class. This material comes from a variety of sources and may go beyond the information covered in the text. Quizzes and the final exam will typically consist of both quantitative and qualitative questions. In all quizzes or final exam, a student will need to show all work on quantitative problems. Pay attention to significant figures. Group assignments will be open book, note and neighbor. The quizzes will be closed book, notes and neighbor. Assignments that cannot be read or are not presented in a professional engineering style will not receive credit. Final exam will be comprehensive. Extra work will be given to individual students to improve grades when possible. I will provide you with your overall grade after each exam. All graded work will be used as a baseline for assigning grades. The following rating will be used for grading.

2.50. Module 50: Sanitary and Environmental Engineering II (CVE424)

Code	Course/Module Title	ECTS	Semester
CVE424	Sanitary and Environmental Engineering II	6	8
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/w)
2	3	75	50

Description

Indicative content includes the following: Wastewater Treatment; River Pollution by Wastewater;

Wastewater characteristics; Laws and Regulations, Centralized and In-situ Treatment [15hrs]. Contamination Prevention and Problem of Direct Discharge; Designing of Sewer Systems including Sanitary, Stormwater and Combined systems [10 hrs]. Conventional Wastewater Treatment Processes; Primary, Secondary, and Advanced Treatment; Clarifier Design Including: Flocculation and Sedimentation Processes; Filtration; Disinfection [30 hrs]. Secondary Treatments including: Activated Sludge, Trickling Filter, Sequencing Batch Reactor, Rotating biological Contactor, and Lagoons [15hrs]. Special Treatment Processes, Reuse and Discharge of Treated Wastewater, Streeter Philips Model [10 hrs]. Stormwater Management Options [5 hrs]. Air Pollution, Characteristics, Global Warming, Primary and Secondary Air Pollutants Devices for Air Pollution Control [10 hrs]. Revision problem classes [5hrs].

2.51. Module 51: Engineering Computer Applications (CVE425)

Code	Course/Module Title	ECTS	Semester
CVE425	Engineering Computer Applications	5	8
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/w)
1	2	45	80
Description			

2.52. Module 52: Engineering Project (ENG006)

Code	Course/Module Title	ECTS	Semester
ENG006	Engineering Project	4	8
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USSWL (hr/w)
2		30	70
Description			

2.53. Module 53: Ethics (UNI007)

Code	Course/Module Title	ECTS	Semester
UNI007	Ethics	1	8
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)

1	-	15	10
Description			
Indicative content includes the following: Definition and sources of ethics [10 hrs]; Obligations on engineers and engineering works [10 hrs]; Professionalism and ethics; obligation towards society, occupation, teams in work, and environment [20 hrs]; and engineering responsibilities [10 hrs].			

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