University of Mosul

Bachelor's Degree (B.Sc.) – Environmental Engineering

3rd cycle

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1. Overview

This catalogue is about the courses (modules) given by the program of Environmental 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.

2. Undergraduate Courses 2025-2026

First Level

1st Semester

Module 1

Code	Course/Module Title	ECTS	Semester
ENV111	Mathematics	6	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/sem)**
3	0/0/0/2	78	72
Description			
This course introduces the students to the main topics of calculus. The course will cover Prerequisites for calculus, Limits, Continuity, and Differentiation (methods and applications), Integration, Applications of Definite Integrals, The Calculus of Transcendental Function, Techniques of Integration. At the end of the course, students will have a broad knowledge of the basic concepts, techniques and applications of differential and integral calculus. This will be achieved through theoretical lectures, tutorials and homework.			

Module 2

Code	Course/Module Title	ECTS	Semester
ENV112	Statics	6	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/sem)**
3	0/0/0/2	78	72
Description			

Statics focuses on the study of stationary bodies and the balance of forces and moments acting upon them. The objective of the course is to equip students with the knowledge and skills necessary to analyze and design structures and static objects to ensure their stability and strength. The course covers Newton's laws for static conditions, with an emphasis on equilibrium laws, force and moment analysis, identifying pressure and shear points, and studying the types of stress and strain experienced by materials in static states. It also includes practical applications through case studies and structural analysis, aiming to prepare students to perform accurate analyses and create safe, suitable designs for engineering and structural purposes.

Module 3

Code	Course/Module Title	ECTS	Semester
ENV113	Engineering Drawing	7	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/sem)**
0	0/6/0/0	93	82
Description			
The aim of this course is to help the students to use the technical drawing and performs drawing exercises with ruler, compass, T-square. make the student able to draw circles with straight lines, arcs and polygon. learns and applies dimensioning rules. knows the properties of cross section view and carry out the perspective drawings due to views. This course has several components that include studying lectures, tutorial, discussion, homework, and e-learning platforms. The course will be taught in English, and all compulsory assignments have to be submitted within the deadlines to be admitted to the exam.			

Module 4

Code	Course/Module Title	ECTS	Semester
ENV114	Environmental Thermodynamics	4	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/sem)**
2	0/0/0/1	48	52
Description			
The Environmental Thermodynamics course addresses the fundamental principles of thermodynamics and their applications to various environmental systems. The course aims to acquaint students with how energy is transferred and transformed within the environment, and to understand the laws governing these processes and their impact on different environmental phenomena. The course includes the study of the two fundamental laws of thermodynamics: the first law concerning energy conservation, and the second law related to system entropy. It also covers thermal and physical processes in the environment by examining environmental applications of thermodynamics such as energy balance analysis and chemical energy			

transformations in the decomposition of organic materials and biotic environmental reactions. Using thermodynamic models, students learn how to assess energy dynamics within ecosystems, contributing to a deeper understanding of the effects of natural changes and human activities on the environment.

Module 5

Code	Course/Module Title	ECTS	Semester
ENV115	Statistics	3	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0/0/0/0	33	42
Description			
There is a need to know how to deal with a large amount of data. The objectives of this module is how to generate informative data and how to extract information from data and to explain the valuable methods to present these data and extract the conclusions from them. Additionally, the module include how to describe the data in a clear manner.			

Module 6

Code	Course/Module Title	ECTS	Semester
UOM1011	Arabic Language 1	2	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/sem)**
2	0/0/0/0	33	17
Description			
The study aims to introduce the student to the main topics of the Arabic language. The semester will cover basic requirements in Arabic language definitions, grammatical rules for tenses, developing grammatical abilities in the singular, plural, and forbidden forms of inventory, in addition to rhetoric and application			

Module 7

Code	Course/Module Title	ECTS	Semester
UOM1040	Democracy and Human Rights	2	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/sem)**
2	0/0/0/0	33	17
Description			
The course aims to expand the student's awareness of democracy and human rights, familiarity with the basic rights that an individual must enjoy, and the ability to distinguish between rights and duties, as well as introducing the student to the concept of human rights, the historical development of human rights and its religious sources, and the rights and freedoms stipulated in the Iraqi constitution.			

First Level

2nd Semester

Module 1

Code	Course/Module Title	ECTS	Semester
ENV121	Calculus	6	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/sem)**
3	0/0/0/2	78	72
Description			
The aim of this course is to introduce the students to the main topics of Calculus The course will cover Integration, Applications of Definite Integrals, The Calculus of Transcendental Function, Techniques of Integration and Polar Coordinates. At the end of the course, students will have a broad knowledge of the basic concepts of integration, techniques of integration, applications of definite integrals, and Polar coordinates. This will be achieved through theoretical lectures, tutorials and homework.			

Module 2

Code	Course/Module Title	ECTS	Semester
ENV122	Dynamics	5	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/sem)**
2	0/0/0/1	48	77
Description			
The course aims to teach the basic concepts and system of forces to enable students to understand the relationship between physical and kinetic processes and to develop the skills necessary to use the basic principles of mechanics in engineering applications.			

Module 3

Semester	ECTS	Course/Module Title	Code
2	4	Principles of Environmental Engineering	ENV123
USWL (hr/sem)	**SSWL (hr/sem)**	**Lect/Lab./Prac./Tutor**	**Class (hr/w)**
37	63	2/0/0/0	2
Description			
The aim of the course is to introduce the student to the main principles of environmental engineering and everything related to environmental pollution: an introduction to the environment, environmental pollution, and the factors that lead to environmental deterioration. Types of pollution (water pollution, air pollution, noise pollution, thermal pollution, water pollution, water sources and their characteristics, Chemical and physical properties of water, water quality, surface water pollution and its sources, groundwater pollution and its sources, treatment of water for drinking purposes with a table of units and a brief explanation of each unit, Treatment and disposal of waste water, characteristics of waste water, treatment objective, plan of wastewater treatment units Treatment and disposal of waste water, characteristics of waste water, treatment goal plan of waste water treatment units, with site visits being conducted to identify the treatment units and environmental projects established and under implementation.			

Module 4

Code	Course/Module Title	ECTS	Semester
ENV124	Environmental Geology	3	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/sem)**
2	0/0/0/0	33	42
Description			
The course aims to introduce students to the principles of environmental geology and the study of the Earth, its materials, and their physical, chemical, and biological properties both internally and externally, as well as its history. It covers the environment and everything surrounding living organisms that affects them. Environmental geology.			

Module5

Code	Course/Module Title	ECTS	Semester
ENV125	Drawing by Computer	7	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
0	0/4/0/0	63	112

Description
The objective of this course is to train students on the AutoCAD software, familiarize them with the software's features, teach them the commands necessary for drawing, and explain how to activate and print.

Module 6

Code	Course/Module Title	ECTS	Semester
UOM1031	Computer 1	3	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/sem)**
1	0/2/0/0	48	27
Description			
The module aim is to prepare student to deal with computers, In addition to teach them the fundamentals of computers and its components. Furthermore, learning how to use two of Microsoft Office applications (Word & Excel).			

Module7

Code	Course/Module Title	ECTS	Semester
UOM1021	English Language 1	2	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/sem)**
2	0/0/0/0	33	17
Description			
The aim of the course is to comprehend the fundamental principles of the English language and explore the foundational concepts essential for learning the key principles of English grammar and expanding English vocabulary. Establish a solid foundation for proficient English writing and speaking. Gain a comprehensive understanding of constructing grammatically accurate English sentences			

Second Level

1st Semester

Module 1

Code	Course/Module Title	ECTS	Semester
ENV211	Engineering Mathematics	6	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/sem)**
3	0/0/0/2	78	72
Description			
This course provides students with the fundamentals for plane analytic geometry (Circle, parabola, Ellipse, Hyperbola), partial derivatives for Functions of two or more variables, Hyperbolic function, Catenary, Multiple Integration and Differential equations (1st order 1st degree).			

Module 2

Code	Course/Module Title	ECTS	Semester
ENV212	Fluids Mechanics	6	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/sem)**
2	0/2/0/2	93	57
Description			
Fluid mechanics deals with the fluid while it is in its static and motion conditions, as the curriculum deals with the basic principles and laws derived on the basis of these principles that govern the fluid in each case. The focus is on the fluid, which is in its liquid state, especially water, as the environmental engineer deals with water in various engineering aspects in the applied field. The application of the laws is clarified through various mathematical examples with their illustrations, after the mathematical formulas for these laws are derived. The curriculum also includes deepening the understanding and assimilation of the theoretical side through practical application by conducting laboratory experiments on a number of the main topics of the subject.			

Module 3

Code	Course/Module Title	ECTS	Semester
ENV213	Environmental Chemistry	4	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/sem)**
2	0/2/0/0	63	37
Description			

The aim of this course is to introduce the students to the area of environmental chemistry. The course will cover the chemistry of the air, water and soil and examine the environmental fate of anthropogenic chemicals released into the environment. This course employs the chemical principles to be used to explain and predict reactions, partitioning, and concentrations of anthropogenic chemicals in different environmental compartments. The course also emphasizes the impact of common pollutants on humans, animals, plants and the nonliving parts of the earth. Then, it will consider possible green chemistry, engineering and societal approaches to mitigating deleterious effects of pollution. The course will be beneficial to chemists, chemical and environmental engineers, and environmental scientists.

Module 4

Code	Course/Module Title	ECTS	Semester
ENV214	Engineering Surveying	5	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/sem)**
3	0/3/0/0	93	32
Description			
This course aims to introduce the students to the category of Engineering surveying . Introductory and definitions, which are used in plane surveying: Instruments for measuring distance obstacles in measurements Instruments for setting out right angles, Tape corrections. Leveling, Areas, and volumes. Computation of volumes. The Theodolite and Traverse surveying. Tachometry. Curves. Total instrument station, GPS field procedure. This will be achieved through descriptive lectures.			

Module 5

Code	Course/Module Title	ECTS	Semester
ENV215	Strength of Materials	4	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/sem)**
2	0/0/0/1	48	52
Description			
This course is a study of the effect of external loads on structural elements and the behavior of the elements under these loads. Determination of different types of stresses, strains and the relation between them, calculation of stresses in thin-walled pressure vessels, drawing shear and bending-moment diagrams of beams, calculation of bending and shear stresses in beams, and calculating deflections in beams using double integration method are explained in details. The course aims to expand the student's understanding of the structural elements' behavior under different loads- that is essential to design and evaluate any structural member.			

Module 6

Code	Course/Module Title	ECTS	Semester
ENV216	Engineering Hydrology	3	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/sem)**
2	0/0/0/0	33	42
Description			
The course will cover discussion of the basic physical principles of the water cycle, different climate factors and components (evaporation, condensation, precipitation, runoff, stream flow). At the end of the course the students will have a working knowledge for estimating Precipitation in different methods as well as Abstraction from Precipitation, Stream flow Measurement, Run-Off, Hydrograph, and Flood Routing and have the skills of analytical skills (analyze data collected in the field and examine the results) and Communication skills (prepare detailed reports that document their research methods and findings). This will be achieved through descriptive lectures with Preparing hydrological reporting and supervised tutorials.			

Module 7

Code	Course/Module Title	ECTS	Semester
UOM201	Crimes of Baath Regime	2	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/sem)**
2	0/0/0/0	33	17
Description			
The aim of the course is to educating students about the crimes committed by the Baath regime Iraq. Directing students to familiarity and knowledge of crimes. Educating students about seriousness of crimes			

Module 8

Code	Course/Module Title	ECTS	Semester
UOM2022	English Language 2	2	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/sem)**
2	0/0/0/0	33	17
Description			
The aim of the course is to foster the development of problem-solving skills, with a particular emphasis on speaking, reading, writing, and listening, while also gaining a comprehensive understanding of the English language as a foreign language through the utilization of various techniques.			

Second Level

2nd Semester

Module 1

Code	Course/Module Title	ECTS	Semester
ENV221	Water Quality Engineering	7	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/sem)**
3	0/2/0/0	78	97
Description			
The aim of this course is to introduce the students to basic concepts on Water Quality Engineering. The course will cover water resources, principal sources of water pollution, Water Quality Management (rivers, lakes and groundwater), Water quality criteria and standards, fate of pollutant in the environment, Modeling of water quality in natural systems. The Lab part: the main goal of this part is to equip students with the expertise and skills necessary for monitoring water quality and analyzing it quantitatively. At the end of the course, students will learn how to analyze different water samples and will acquire the necessary expertise and skills to monitor and analyze water quality. This will be achieved through lectures, laboratories and tutorials.			

Module 2

Code	Course/Module Title	ECTS	Semester
ENV222	Concrete and Building Technology	6	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/sem)**
3	0/2/0/0	78	72
Description			
This course is aimed principally at university and college students who wish to understand the concrete for the purpose of using it in professional practice. The students must take sufficient care to ensure the selection of correct ingredients, for concrete making to achieve a suitable mix, and to obtain a technically sound execution of concrete works. They must also have an intimate knowledge of the interaction between the different components that go into making concrete, whether in a fresh state or in a hardened state. Moreover, this course gives principles of building systems, construction methods and techniques, starting from the idea, feasibility study, preparation of plans, methods of implementation, and excavation. Besides that, the equipment and methods of transporting and compacting of concrete, and an explanation of masonry units with their properties and methods of construction with them. The course covers the structural as well as finish works.			

Module 3

Code	Course/Module Title	ECTS	Semester
ENV223	Survey Applications and GIS	6	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/sem)**
2	0/3/0/0	78	72
Description			
This course provides an overview of the physical principles of remote sensing, develops skills in spatial analysis and remote sensing software, and introduces remote sensing data processing with applications for land resource management and monitoring. Students will learn to apply these concepts to environmental applications, create databases, perform automated digitization of satellite imagery and spatial analysis, and create environmental maps of pollution sites with descriptive terrestrial data. The course also trains students in using total station devices for surveying and map projection.			

Module 4

Code	Course/Module Title	ECTS	Semester
ENV224	Microbiology	6	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/sem)**
2	0/2/0/0	63	87
Description			
To enhance the understanding of microbial function in engineered systems, initially students are supposed to learn how to deal with different types of microorganisms and it's useful in designing wastewater and water treatment plants. Also, microorganisms play an important role in the protection of humans, animals, plants, air, soil, and engineering systems from chemical or biological pollution, deterioration, and corrosion, and in the restoration of polluted and degraded environments.			

Module 5

Code	Course/Module Title	ECTS	Semester
UOM2012	Arabic Language 2	2	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/sem)**
2	0/0/0/0	33	17

Description
The course aims to introduce the student to the main topics of the Arabic language subject. The semester will cover the basic requirements including definitions of the Arabic language, grammatical rules for tenses, development of grammatical skills in singular, plural, and jussive forms, in addition to rhetoric and application

Module 6

Code	Course/Module Title	ECTS	Semester
UOM2032	Computer 2	3	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/sem)**
2	0/2/0/0	63	12
Description			
The main strategy that will be adopted in delivering this module is to encourage students' participation in the Lab activities, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, laboratory and by considering type of external search involving some of computer technology that are interesting to the students.			

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