University of Mosul

جامعة الموصل

First Cycle – Bachelor's degree (B.Sc.) – Soil Sciences and Water Resources

بكالوريوس علوم زراعة - علوم التربة والموارد المائية

Table of Contents

1. Overview
2. Undergraduate Modules 2023-2024
3. Contact

1. Overview

This catalogue is about the courses (modules) given by the program of soil sciences and water resources to gain the Bachelor of Agriculture degree. The program delivers (56) Modules with (6000) total student workload hours and 240 total ECTS. The module delivery is based on the Bologna Process.

2. Undergraduate Courses 2024-2025

Module 1

Code	Course/Module Title	ECTS	Semester
UOM1031	**COMPUTER**	3	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
0	3	47	28
Description			
The "Computer Skills" module is designed to equip students with essential computing knowledge and practical skills needed for academic and professional success. It covers key areas such as basic computer operations, word processing, spreadsheet management, and presentation software. Students will also gain familiarity with internet navigation, email usage, and data management tools. The module introduces fundamental concepts in computer security, cloud computing, and the use of collaborative tools for teamwork. By the end of the course, students will be able to effectively use software applications to organize, analyze, and present information, while also understanding the ethical and secure use of technology in a modern digital environment			

Module 2

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/w)**
2	0	32	18
Description			
The "Democracy and Human Rights" module explores the fundamental principles and concepts			

underlying democratic governance and the protection of human rights. Students will study the evolution of democracy, different democratic systems, and the roles of institutions in promoting participation, transparency, and accountability. The course also addresses key human rights issues, including civil, political, social, and economic rights, as well as international frameworks that protect these rights. Through case studies and discussions, students will analyze the challenges facing democracy and human rights in different regions and contexts. By the end of the module, students will have a deeper understanding of the interconnection between democratic values and human rights, and the importance of safeguarding these principles in modern society.

Module 3

Code	Course/Module Title	ECTS	Semester
UOM1021	**ENGLISH LANGUAGE**	2	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0	32	18
Description			
The "English Language" module is designed to enhance students' proficiency in English, focusing on the four essential language skills: listening, speaking, reading, and writing. It provides a comprehensive approach to language learning, covering grammar, vocabulary, pronunciation, and sentence structure. Through interactive activities, such as discussions, presentations, and written assignments, students will improve their ability to communicate effectively in academic, professional, and social contexts. The module also emphasizes comprehension and analysis of texts, both written and spoken, to develop critical thinking skills. By the end of the course, students will have gained confidence in using English in various settings and will be better prepared for further academic studies and global communication.			

Module 4

Code	Course/Module Title	ECTS	Semester
MAT1010	**MATHEMATICS**	7	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	112
Description			
The "Mathematics" module provides students with a strong foundation in essential mathematical concepts and problem-solving techniques. Covering topics such as algebra, geometry, calculus, and statistics, the course emphasizes both theoretical understanding and practical application. Students will develop critical thinking and analytical skills, enabling them to tackle complex mathematical problems in various fields. Through exercises and real-world examples, the module aims to enhance logical reasoning and quantitative skills, preparing students for further studies and professional applications in science, engineering, economics, and more.			

Module 5

Code	Course/Module Title	ECTS	Semester
ACE1020	**AGRICULTURE CAREER ETHICS**	5	1
Class (hr/w)	**Lect/Lab./Prac./Tutor/semn**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	62
Description			
The "Agricultural Professional Ethics" module introduces students to the ethical principles and responsibilities relevant to agricultural professionals. The course covers topics such as sustainability, environmental stewardship, tree welfare, and fair labor practices. Students will explore the ethical challenges faced in modern agriculture, including the impact of agricultural practices on ecosystems and society. Through case studies and discussions, the module encourages critical thinking about moral issues and promotes a commitment to ethical decision-making in agricultural practices. By the end of the course, students will understand the importance of ethics in fostering sustainable and responsible agricultural development.			

Module 6

Code	Course/Module Title	ECTS	Semester
END1030	**ENGINEERING DRAWING**	6	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
1	3	63	87
Description			
The "Engineering Drawing" module equips students with the fundamental skills of technical drawing, essential for all engineering disciplines. It covers basic principles of orthographic projection, isometric views, and sectional drawings. Students will learn how to interpret and create accurate engineering drawings, focusing on line work, dimensions, scaling, and geometric tolerances. The module also introduces the use of computer-aided design (CAD) software, enabling students to produce precise technical diagrams. By the end of the course, students will be proficient in visualizing and communicating design concepts, preparing them for advanced engineering tasks.			

Module 7

Code	Course/Module Title	ECTS	Semester
AET1040	**AGRICULTRAL ENGINEERING TECHNIQUES TRANSFER**	5	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	62

قسم علوم التربة والموارد المائية

Description
The "Agricultural Engineering Techniques Transfer" module focuses on the application and dissemination of modern engineering solutions in agriculture. It covers the principles of technology transfer, including the adoption of advanced machinery, irrigation systems, and precision farming tools. Students will learn how to assess and implement engineering techniques that enhance agricultural productivity and sustainability. The module emphasizes communication skills for effectively transferring knowledge to farmers and agricultural stakeholders. By the end of the course, students will be prepared to bridge the gap between agricultural research and practical field applications, promoting innovation in the agricultural sector.

Module 8

Code	Course/Module Title	ECTS	Semester
UOM1011	**ARABIC LANGUAGE**	2	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0	32	18
Description			
The "Arabic Language" module is designed to develop students' proficiency in reading, writing, speaking, and listening in Arabic. It covers essential grammar, vocabulary, and sentence structure while emphasizing both classical and modern Arabic. Through various texts, writing exercises, and oral activities, students will enhance their communication skills and cultural understanding. The course also focuses on improving comprehension of complex texts and refining formal and informal writing styles. By the end of the module, students will have strengthened their ability to use Arabic effectively in academic, professional, and social contexts.			

Module 9

Code	Course/Module Title	ECTS	Semester
BSS1050	**BIOSAFETY and SECURITY**	3	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
1	2	47	28
Description			
The "Biosafety and Security" module provides students with an understanding of the principles and practices necessary to ensure safety in biological research and biotechnology. It covers topics such as risk assessment, containment strategies, and the safe handling of biological materials. Students will explore the ethical and legal frameworks governing biosafety, as well as the potential threats of biological hazards and biosecurity risks. The module emphasizes the importance of implementing proper protocols to protect both public health and the environment. By the end of the course, students will be equipped with the knowledge to manage biosafety in laboratory and field settings.			

Module 10

Code	Course/Module Title	ECTS	Semester
AGS1060	**AGRICULTURAL STATISTICS**	5	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	78	47
Description			
The "Agricultural Statistics" module introduces students to the statistical methods and tools used in agricultural research and data analysis. Topics covered include data collection, probability, hypothesis testing, regression analysis, and experimental design. Students will learn how to apply statistical techniques to solve real-world agricultural problems, such as crop yield analysis, soil quality assessment, and livestock management. The course emphasizes the interpretation of statistical results to inform decision-making in agricultural practices. By the end of the module, students will be able to analyze and interpret agricultural data, supporting evidence-based approaches in farming and research.			

Module 11

Code	Course/Module Title	ECTS	Semester
BIO1070	**BIODIVERSITY**	5	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	62
Description			
The "Biodiversity" module explores the variety of life forms on Earth and their ecological significance. Students will study the different levels of biodiversity, including genetic, species, and ecosystem diversity, and their roles in maintaining ecosystem health and resilience. The course covers key concepts such as habitat conservation, the impacts of human activities on biodiversity, and strategies for sustainable management. Through case studies and fieldwork, students will learn about the importance of preserving biodiversity for food security, environmental stability, and human well-being. By the end of the module, students will appreciate the complex interrelationships among species and the need for conservation efforts.			

Module 12

Code	Course/Module Title	ECTS	Semester
AGI1080	**AGRICULTURAL INFORMATICS**	5	2
Class (hr/w)	**Lect/Lab./Prac./Tutor/semn**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	62
Description			

The "Agricultural Informatics" module focuses on the integration of information technology and data management in the agricultural sector. Students will learn about the tools and techniques used to collect, analyze, and interpret agricultural data, including Geographic Information Systems (GIS), remote sensing, and data analytics. The course emphasizes the role of informatics in improving decision-making, enhancing productivity, and promoting sustainable agricultural practices. Through practical exercises and case studies, students will develop skills in managing agricultural information systems and utilizing technology for precision farming and resource management. By the end of the module, students will be equipped to leverage informatics in addressing contemporary agricultural challenges.

Module 13

Code	Course/Module Title	ECTS	Semester
SUD1090	**SUSTANIBLE DEVELOPMENT**	5	2
Class (hr/w)	**Lect/Lab./Prac./Tutor/semn**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	62
Description			
The "Sustainable Development" module explores the principles and practices essential for achieving a balance between environmental, social, and economic sustainability. Students will study key concepts such as the United Nations Sustainable Development Goals (SDGs), resource management, and community engagement. The course examines the interconnections between human activities and environmental health, focusing on strategies to address challenges such as climate change, biodiversity loss, and poverty. Through case studies and project-based learning, students will develop critical thinking and problem-solving skills to promote sustainable practices in various sectors. By the end of the module, students will be prepared to contribute to sustainable development initiatives locally and globally.			

Module 14

Code	Course/Module Title	ECTS	Semester
AMT1100	**AGRICULTURAL MARKETING TECHNIQUES**	5	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0	32	93
Description			
The "Agricultural Marketing Techniques" module provides students with a comprehensive understanding of marketing principles specific to the agricultural sector. It covers key topics such as market analysis, consumer behavior, pricing strategies, and distribution channels for agricultural products. Students will learn effective techniques for promoting and selling crops, livestock, and other agricultural goods in domestic and international markets. The course emphasizes the importance of branding, quality assurance, and sustainable practices in marketing. Through case studies and practical exercises, students will develop skills to create effective marketing plans and strategies that enhance competitiveness and profitability in the agricultural industry.			

Module 15

Code	Course/Module Title	ECTS	Semester
UOM1012	**ARABIC LANGUAGE 2**	2	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0	32	18
Description			
The "Arabic Language" module is designed to develop students' proficiency in reading, writing, speaking, and listening in Arabic. It covers essential grammar, vocabulary, and sentence structure while emphasizing both classical and modern Arabic. Through various texts, writing exercises, and oral activities, students will enhance their communication skills and cultural understanding. The course also focuses on improving comprehension of complex texts and refining formal and informal writing styles. By the end of the module, students will have strengthened their ability to use Arabic effectively in academic, professional, and social contexts.			

Module 16

Code	Course/Module Title	ECTS	Semester
UOM2050	**The CRIMES of the BATH REGIME in IRAQ**	2	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0	32	18
Description			
The "Crimes of the Ba'ath Regime in Iraq" module examines the human rights abuses and atrocities committed during the rule of the Ba'ath Party. Students will explore key events such as the Anfal Campaign, chemical attacks, mass executions, and the suppression of political dissent. The module also delves into the legal, social, and historical context of the regime's actions, analyzing the impact on various ethnic and religious groups. By studying testimonies, legal documents, and historical accounts, students will gain a deeper understanding of the regime's legacy and its consequences for Iraq and the wider region.			

Module 17

Code	Course/Module Title	ECTS	Semester
IPM2110	**INTEGRATED PEST MANAGEMENT**	5	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	62
Description			

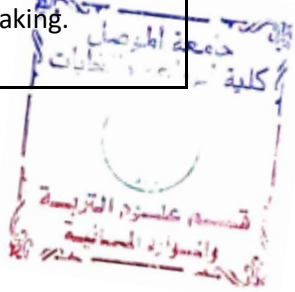
The "Integrated Pest Management" (IPM) module focuses on sustainable and environmentally friendly approaches to managing agricultural pests. Students will learn about the principles of IPM, which combines biological, cultural, mechanical, and chemical methods to control pests while minimizing harm to ecosystems. The course covers pest identification, monitoring techniques, and decision-making processes to implement effective pest control strategies. Emphasis is placed on reducing pesticide use and promoting natural predators. By the end of the module, students will be equipped with the knowledge and skills to design and apply integrated pest management plans that enhance crop production and protect the environment

Module 18

Code	Course/Module Title	ECTS	Semester
AEM2120	**AGRICULTRAL ENGINEERING PROJECT MANAGEMENT**	6	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	78	72
Description			
The "Agricultural Engineering Project Management" module provides students with the skills and knowledge necessary to plan, execute, and manage engineering projects in the agricultural sector. Topics covered include project planning, resource allocation, budgeting, risk management, and the use of modern project management tools. The course emphasizes effective communication, leadership, and decision-making skills to ensure successful project outcomes. Students will learn how to manage various agricultural projects, such as irrigation systems, farm infrastructure, and machinery installation. By the end of the module, students will be capable of overseeing complex agricultural engineering projects from conception to completion.			

Module 19

Code	Course/Module Title	ECTS	Semester
DAE2160	**DESIGN AND ANALYSIS of EXPERIMENTS**	5	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	62
Description			
The "Design and Analysis of Experiments" module introduces students to the principles and methodologies used in planning, conducting, and analyzing scientific experiments. The course covers key topics such as experimental design, randomization, replication, and the analysis of variance (ANOVA). Students will learn how to create experiments that yield valid, reliable results and how to analyze data using statistical methods to draw meaningful conclusions. Emphasis is placed on practical applications in agricultural and biological research. By the end of the module, students will be able to design robust experiments and interpret experimental data for research and decision-making.			



Module 20

Code	Course/Module Title	ECTS	Semester
APT2140	**AGRICULTURAL PRODUCTION TECHNOLOGIES**	5	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	62
Description			
The "Agricultural Production Technologies" module introduces students to the latest innovations and technologies used to enhance agricultural productivity and sustainability. Topics include precision farming, advanced irrigation systems, greenhouse technologies, and the use of biotechnology in crop and livestock production. Students will explore how these technologies optimize resource use, improve yields, and reduce environmental impacts. The course also covers the integration of digital tools like drones, sensors, and data analytics to monitor and manage agricultural processes. By the end of the module, students will be equipped with practical knowledge of cutting-edge technologies to improve efficiency in agricultural production.			

Module 21

Code	Course/Module Title	ECTS	Semester
FTP2150	**FOOD TECHNOLOGIES and HEALTH AGRICULTRAL PRODUCTS**	5	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	62
Description			
The "Food Technologies and Health Agricultural Products" module focuses on the processing, preservation, and safety of agricultural products to ensure high nutritional value and quality. Students will learn about modern food technologies used in the production of healthy and safe food, including techniques like pasteurization, canning, drying, and packaging. The course also covers the impact of these technologies on the nutritional content of food, as well as regulations and standards for food safety. By the end of the module, students will understand how to apply advanced food technologies to produce health-focused agricultural products that meet consumer demands.			

Module 22

Code	Course/Module Title	ECTS	Semester
UOM2022	**ENGLISH LANGUAGE2**	2	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0	32	18
Description			

The "English Language" module is designed to enhance students' proficiency in English, focusing on the four essential language skills: listening, speaking, reading, and writing. It provides a comprehensive approach to language learning, covering grammar, vocabulary, pronunciation, and sentence structure. Through interactive activities, such as discussions, presentations, and written assignments, students will improve their ability to communicate effectively in academic, professional, and social contexts. The module also emphasizes comprehension and analysis of texts, both written and spoken, to develop critical thinking skills. By the end of the course, students will have gained confidence in using English in various settings and will be better prepared for further academic studies and global communication.

Module 23

Code	Course/Module Title	ECTS	Semester
UOM2032	**COMPUTER SKILLS2**	3	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
0	3	47	28
Description			
The "Computer Skills" module is designed to equip students with essential computing knowledge and practical skills needed for academic and professional success. It covers key areas such as basic computer operations, word processing, spreadsheet management, and presentation software. Students will also gain familiarity with internet navigation, email usage, and data management tools. The module introduces fundamental concepts in computer security, cloud computing, and the use of collaborative tools for teamwork. By the end of the course, students will be able to effectively use software applications to organize, analyze, and present information, while also understanding the ethical and secure use of technology in a modern digital environment			

Module 24

Code	Course/Module Title	ECTS	Semester
APT2130	**AGRICULTURAL PRODUCTION MECHANIZATION TECHNIQUES**	5	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	62
Description			
The "Agricultural Production Mechanization Techniques" module focuses on the use of machinery and technology to enhance the efficiency and productivity of agricultural operations. Students will study various mechanization techniques, including the use of tractors, harvesters, irrigation systems, and planting equipment. The course covers the principles of machine operation, maintenance, and safety, along with the economic and environmental impacts of mechanization. Emphasis is placed on selecting appropriate machinery for different farming tasks to optimize production. By the end of the module, students will be able to apply modern mechanization techniques to improve agricultural processes and sustainability.			

Module 25

Code	Course/Module Title	ECTS	Semester
DPF2170	**DESIGN and PLANNING of AGRICULTURAL FACILITIES**	5	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	62
Description			
The "Design and Planning of Agricultural Facilities" module focuses on the principles of designing and developing efficient and sustainable infrastructure for agricultural operations. Students will learn how to plan and design key facilities such as storage buildings, greenhouses, irrigation systems, livestock housing, and processing units. The course emphasizes factors like cost-efficiency, environmental impact, and functionality in agricultural production. Topics also include site selection, layout optimization, and the use of modern materials and technologies. By the end of the module, students will be equipped to plan and design agricultural facilities that enhance productivity and sustainability.			

Module 26

Code	Course/Module Title	ECTS	Semester
BEI180	**BENEFICIAL INSECTS**	5	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	62
Description			
The overall objective of the course is to provide general information about beneficial insects with a focus on the most important modern techniques in their rearing, knowledge of their products, and how to employ them in the labor market to benefit from them in increasing individual income. In addition, the basic knowledge of beneficial insects that will be covered in this lesson includes the effect of beneficial insects on plants and the environment, their types, methods of propagating beneficial insects according to modern techniques, and their products. General strategies for managing the most important diseases that affect beneficial insects, how to identify and diagnose them, and methods of treating them will also be discussed.			

Module 27

Code	Course/Module Title	ECTS	Semester
SWS2190	**SOIL and WATER SUITBILITY**	5	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	62
Description			

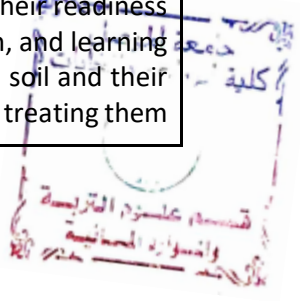
The "Design and Soil and Water Suitability" module focuses on evaluating soil and water resources for optimal agricultural use. Students will learn techniques for assessing soil properties, water availability, and quality to determine their suitability for different crops and farming systems. The course covers topics such as soil classification, irrigation design, drainage systems, and sustainable water management practices. Students will also explore the environmental impact of agricultural activities on soil and water resources. By the end of the module, students will be able to design effective land-use strategies that maximize productivity while preserving soil and water health.

Module 28

Code	Course/Module Title	ECTS	Semester
BIA2200	BIOCHEMICAL ANALYSIS	5	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	62
Description			
The "Biochemical Analysis" module introduces students to the principles and techniques used in the biochemical analysis of agricultural products and processes. The course covers experimental design, sample preparation, and the application of various analytical methods, including chromatography, spectroscopy, and enzymatic assays. Students will learn to assess the composition and quality of food, soil, and plant materials through biochemical analysis. Emphasis is placed on interpreting results and understanding their implications for agricultural practices and food safety. By the end of the module, students will be equipped to design and conduct experiments that enhance biochemical understanding in agricultural contexts.			

Module 29

Code	Course/Module Title	ECTS	Semester
SOF3210	**SOIL FERTILITY**	2	5
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
1	1	32	18
Description			
"Soil fertility" is concerned with the nutrients, organic and mineral materials in the soil, which are an indicator of the fertility of the soil. Soil that provides the plant with the nutrients it needs without the need to add fertilizers is considered fertile soil. The main objective of this lesson includes several axes, including learning about the methods of taking soil samples and preparing them for chemical analysis, how to evaluate soil fertility, preparing fertilizer recommendations, as well as methods of detecting different fertilizers and calculating the quantities of added fertilizers, the method and time of adding them, as well as knowing the sources and forms of nutrients and the factors that affect their readiness and the different physiological functions of these elements and their role in plant growth, and learning about the most important methods of measuring the concentrations of nutrients in the soil and their critical limits. This lesson also focuses on diagnosing symptoms of nutrient deficiency and treating them			



in the appropriate manner and time.

Module 30

Code	Course/Module Title	ECTS	Semester
ASM3220	**Agricultural Soil Mechanics**	3	5
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	12
Description			
Agricultural Soil Mechanics is a branch of agricultural engineering that deals with the physical and mechanical behavior of soil and its influence on agricultural activities. The subject covers topics such as soil density, porosity, moisture content, bearing capacity, shear strength, and compaction. This knowledge is essential for designing effective farm machinery, improving tillage systems, planning irrigation and drainage networks, and ensuring the stability of agricultural structures like greenhouses and storage tanks. It also aids in assessing soil suitability for cultivation and promoting sustainable land management practices.			

Module 31

Code	Course/Module Title	ECTS	Semester
DRE4590	**DRENAGE**	5	5
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	62
Description			
The "DRENAGE" introduces students to modern methods and tools used in the disposal of excess water and the rise of groundwater. Topics covered include investigations, drain design, equations used, determining the spacing between drains, and maintenance of drainage networks. Students will learn how to apply modern techniques to solve agricultural problems, such as the use of modern techniques, assessment of soil quality, and water movement. Emphasis is placed on interpreting the results to inform decision-making in agricultural practices. By the end of the unit, students will be able to analyze, interpret, and understand how to dispose of excess water in soil, and support scientific and practical methods in agriculture and scientific research.			

Module 32

Code	Course/Module Title	ECTS	Semester
SOP3500	**SOIL PHYSICS**	5	5
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	62
Description			
The term " **SOIL PHYSICS**" study the physical properties and processes occurring within soil. It involves analyzing how soil interacts with water, air, heat, and mechanical forces. This field is crucial for understanding soil behavior in agricultural. It is concerned with the soil as a three-phase system and the mathematical relationships that connect those phases. Solid, liquid and gas phases. It can estimate and name soil texture, which has an important effect on soil water properties, such as moisture retention, volume of water available to plants, water movement within the soil pedon, and hydraulic conductivity under saturated and unsaturated conditions. In addition to estimate the soil bulk density, porosity, modulus of rupture and shear stress. This knowledge enables the student understand Cohesion and adhesion properties, as well as Soil air and soil temperature			

Module 33

Code	Course/Module Title	ECTS	Semester
SWP3510	**SOIL and WATER POLLUTION**	5	5
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	62
Description			
SOIL and WATER POLLUTION : Soil is one of the natural resources that is exposed to a number of different problems due to many and varied factors, the problem of pollution is one of the most important and difficult problems facing soils in the world at the present time. It means the entry of foreign substances into the soil or an increase or decrease in the concentrations of one of its natural components, which leads to an imbalance and imbalance in its chemical and physical properties. These substances are called soil pollutants that come from natural sources or are caused by humans. Naturally, these pollutants directly or indirectly affect the health of humans, animals and plants throughout the food chain, even on agricultural lands and sources of surface and groundwater resources			

Module 34

Code	Course/Module Title	ECTS	Semester
RES3230	**REMOTE SENSING**	5	5
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	62

Description
The Module "**REMOTE SENSING** " is a scientific and technical field that focuses on collecting and analyzing information about the Earth's surface and natural phenomena without direct contact, using sensing techniques based on electromagnetic radiation. This course aims to introduce students to the fundamental principles of remote sensing and how to apply them in studying geographical and environmental phenomena. academic course designed to teach students the principles, techniques, and applications of remote sensing. It focuses on how to collect, process, analyses, and interpret data gathered from remote sensing technologies, such as satellites, drones, and sensors, to study Earth's surface and atmosphere.

Module 35

Code	Course/Module Title	ECTS	Semester
SOC3520	**SOIL CHEMISTRY**	5	5
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	62
Description			
The study of " **SOIL CHEMISTRY**" focuses on the chemistry of soil system components and related studies of all chemical and physicochemical processes in the soil. These processes reflect the chemical and physical properties of the soil system and their effect on the behavior and transformations of nutrients in the soil. It enables the student to understand and comprehend the factors influencing the study of the most important chemical reactions occurring in the soil solution and to understand the difference between the natural systems of reactions that occur in the solid and liquid phases of the soil. It emphasizes a very important aspect, which is the interaction between the liquid and solid phases, and the resulting phenomena such as ion exchange, oxidation-reduction reactions, acid-base neutralization reactions, and the solubility equilibrium of carbonates, phosphates, and other reactions.			

Module 36

Code	Course/Module Title	ECTS	Semester
SOS3530	**SOIL SALINITY**	4	6
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
1	2	48	52
Description			
The module "**SOIL SALINITY**" subject is concerned with how to identify the problem of soil salinity in the field and laboratory, and knowing the type, concentration and quantity of salts prevailing in the soil, and knowing how to deal with each type of salts prevailing in the soil, and whether these salts are of the fast-dissolving type or of the sparingly soluble type, to determine the mechanism and type of			

washing for each type of salt, and knowing the effect of salts on the chemical and physical properties of the soil and their effect on plant growth directly or indirectly, and knowing the types of plants, whether they are sensitive to salinity or resistant to salts, and identifying the type of irrigation water and how to classify it to determine its suitability for irrigation and its effect on the soil and plants, and enabling students to evaluate and describe soils affected by salinity according to scientific concepts and foundations, entering the agricultural sector with distinguished efficiency by participating in reclamation projects for lands affected by salts. Directing students towards a desire to obtain better experiences when applying for postgraduate studies.

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Module 37

Code	Course/Module Title	ECTS	Semester
AGR3540	**AGROGEOLOGY**	5	6
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	62
Description			
The module, "AGROGEOLOGY," covers the basic study of the Earth's structure from the core to the crust. It studies the chemical and physical properties of minerals and rocks. understanding the nature and origin of igneous, metamorphic, and sedimentary rocks and their classification. Explain the role of weathering and erosion of rocks in the formation of agricultural soil. Focusing on all aspects of earth science that relate to agriculture soil from different points of view, like the right balance of minerals and types of clay minerals. So geology can tell us a great deal about healthy soils for better agricultural production. Focus on topography, geomorphology, parent material, and geological formations, which play a major role in soil formation under different environmental conditions, and the effect of these factors on the distribution and properties of soils in order to maintain and enhance soil productivity for increased agricultural production and a sustainable agricultural ecosystem			

Module 38

Code	Course/Module Title	ECTS	Semester
SOM3550	**SOIL MINERALS**	5	6
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	62
Description			
The module "**SOIL MINERALS** " study of the mineral composition of the solid phase of soil system components is of utmost importance in understanding the nature of the soil's core components and determining the extent of variation in deposition. The mineral portion consists of a mixture of particles of different sizes and proportions depending on soil formation factors. The study of clay minerals focuses on crystallization processes and the formation of primary minerals from the coarse fraction,			

represented by the silt and sand fractions, as well as the mineral composition of the clay fraction, known as clay minerals. This allows the student to understand and comprehend the relationship between crystals, their systems, and axes, in addition to understanding the structural composition of silicate minerals and the transformations, formation, and types of clay minerals.

Module 39

Code	Course/Module Title	ECTS	Semester
SOM3560	**SOIL MORPHOLOGY**	5	6
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	62
Description			
The module “Soil morphology” is the science that studies the physical and visible properties of soil, including its composition, structure, and layers. The course focuses on analyzing the apparent characteristics of soil to understand the processes that lead to its formation and development, thereby aiding in its classification and evaluation of its capacity to support agricultural and hydrological activities.By studying soil morphology, students can infer the processes of soil genesis, environmental history, and potential uses or limitations for agriculture, construction, and land management. It is a foundational discipline in soil science and plays a critical role in understanding land resources and environmental systems.			

Module 40

Code	Course/Module Title	ECTS	Semester
SWA3570	**SOIL ,WATER and PLANT ANALYSIS**	5	6
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	62
Description			
Soil, water and plant analysis includes identifying the main soil components (solid, liquid and gaseous parts). It explains the application of the foundations of laboratory work in analyzing soil, water, and plants, which means applying a set of procedures and steps that achieve accurate and reliable results. Among these foundations are: preparing soil samples, using appropriate equipment, recording data, then documenting and preparing reports. The student will be able to identify the best methods for taking soil, water, and plant samples, and then apply the appropriate method in laboratory analysis to estimate nutrients and their forms, as there are several methods, including gravimetric and mechanical analysis, and potential difference analysis.			

Module 41

Code	Course/Module Title	ECTS	Semester
HWR3580	**HYDROLOGY and WATER RESOURCES**	5	6
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	62
Description			
The module "HYDROLOGY and WATER RESOURCES" includes an overview of water properties, a brief description to understand the hydrological cycle, and focuses on the types and characteristics of precipitation, effective rainfall, evaporation, infiltration, surface runoff, and subsurface flow. Identifying the different types of aquifers; principles of groundwater flow. Analysis stream flow and discharge data. Water Budget Equation. Focuses on hydrograph analysis and its components, factors affecting its shape. Studies the surface-water/groundwater interaction. Studies the various techniques for rainfall water harvesting, especially in arid and semi-arid areas. Assessment of the relationship between surface runoff and rainfall. Flood and flood control to reduce or prevent the detrimental effects of flood water and erosion of sediments. Discussing and analyzing the different issues that relate to water resources management under natural and human-induced factors to develop student's ability to deal with hydrological data in logical and scientific ways.			

Module 42

Code	Course/Module Title	ECTS	Semester
SEM3260	**SEMINARS**	1	6
Class (hr/w)	**Lect/Lab./Prac./Tutor/semn**	**SSWL (hr/sem)**	**USWL (hr/w)**
0	1	17	8
Description			
The Seminar course is a research-based subject designed for fourth-year students, aiming to develop their skills in selecting academic topics, gathering reliable sources, conducting systematic analysis, writing scientific findings, and presenting them for discussion, thereby enhancing their critical thinking and academic communication abilities.			

Module 43

Code	Course/Module Title	ECTS	Semester
MIT4350	**MODERN IRRIGATION TECHNIQUES**	3	7
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	12

Description
The module “MODERN IRRIGATION TECHNIQUES “ clarify irrigation systems is concerned with enumerating and clarifying irrigation methods, which were traditional methods, such as forms of surface irrigation, as well as modern irrigation methods, such as sprinkler irrigation and drip irrigation. The student is also able to learn the advantages and limitations of the proposed irrigation method and its suitability, especially for the soil properties and topography of the field, and will be able to identify the volume of irrigation water required to be added to irrigate an area of the field during a period of time, thus obtaining the appropriate moisture content of the soil. From a practical standpoint, the student and researcher are able to evaluate the efficiency of the irrigation method used and the uniformity of the field’s soil moisture, thus being able to increase irrigation efficiency and reduce water losses.

Module 44

Code	Course/Module Title	ECTS	Semester
SOC4600	**SOIL SURVEY and CLASSIFICATION**	5	7
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	62
Description			
The "Soil Survey and Classification" module focuses on surveying soil resources and based on soil properties, soils and lands can be classified and soil maps can be created for optimal land use. Students will learn how to survey soils, identify field units of land, and classify soils based on international classification systems, especially the American Soil Classification System. The course covers topics such as types and grades of soil surveys and lands field units, as well as the advantages and disadvantages of international classification systems, with emphasis on the American Soil Classification System. By the end of the module, students will be able to survey and identify soils, create and interpret soil maps, and classify soils based on the modern American Soil Classification System.			

Module 45

Code	Course/Module Title	ECTS	Semester
SOM4610	**SOIL CONSERVATION**	5	7
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	62
Description			
The module “**SOIL CONSERVATION** “ is a scientific and practical discipline focused on the sustainable management of soil and water resources to prevent degradation, maintain productivity, and ensure long-term environmental health. This subject emphasizes the importance of protecting soil from erosion, compaction, and nutrient depletion while ensuring efficient water use and management to combat issues such as water scarcity, runoff, and pollution. The course covers topics like the principles			

and processes of soil erosion, hydrological cycles, and water conservation techniques. It explores methods for reducing soil loss (e.g., contour farming, terracing, agroforestry), improving water retention (e.g., rainwater harvesting, mulching), and mitigating land degradation caused by both natural and human activities. Students also learn about the socio-economic and environmental impacts of soil and water mismanagement, as well as strategies for sustainable land use planning and watershed management.

Module 46

Code	Course/Module Title	ECTS	Semester
SOM4610	**SOIL MICROBIOLOGY**	5	7
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	62
Description			
Soil biosimilars break down all natural organic materials, improve soil fertility by breaking down the tissues of plants and animals, and integrate the released products and minerals with the soil. Some of their types also have the ability to dissolve some human-made products. Soil organisms, both plant flora and animal fauna, transform decomposed materials into an important organic complex in the soil called humus, which is composed of about 60% carbon and about 6% nitrogen, in addition to organic phenolic and phosphate compounds, complex sugars, and others. Soil animals, through their movement, mix humus with the soil. This helps improve the properties of the soil by breaking up its particles, aerating it, moving water in it, and making the formed humus accessible to microorganisms. Microorganisms break down and dissolve humus, and this decomposition occurs slowly, releasing plant nutrients from it after the death of these organisms.			

Module 47

Code	Course/Module Title	ECTS	Semester
DES4620	**DESERTIFICATION**	5	7
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	62
Description			
The module “Desertification” is a scientific subject that focuses on studying the phenomenon of land degradation in arid, semi-arid, and dry sub-humid regions due to environmental changes and human activities. The course aims to introduce students to the concept of desertification, its causes, and its environmental, social, and economic impacts, as well as strategies for combating it and restoring degraded lands. Desertification focuses on educating students about the processes, causes, impacts, and solutions related to land degradation in arid, semi-arid, and dry sub-humid regions. It provides a multidisciplinary approach that combines elements of environmental science, geography, climatology, agriculture, and socioeconomics to understand the phenomenon comprehensively.			

Module 48

Code	Course/Module Title	ECTS	Semester
SEM4280	SOIL ENVIRONMENT METEOROLOGY	5	7
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	62
Description			
The module "**SOIL ENVIRONMENT METEOROLOGY** " Studying environmental science, climate, and weather provides students with crucial insights into how these factors influence soil and plant health. It explores the effects of climate change on soil fertility, erosion, and water retention, as well as how weather patterns impact crop growth and agricultural productivity. Understanding these dynamics helps students develop strategies to improve soil management, adapt farming practices, and ensure sustainable food production. This knowledge is essential for mitigating the adverse effects of extreme weather events and creating resilient agricultural systems. Ultimately, it empowers individuals to protect natural resources while promoting sustainable land use and ecological balance.			

Module 49

Code	Course/Module Title	ECTS	Semester
AEP4290	AGRICULTRUAL ENGINEERING PROJECT1	2	7
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
0	3	47	3
Description			
The "Agricultural Engineering Project" module provides students with hands-on experience in applying engineering principles to solve real-world agricultural problems. Throughout the course, students will work on individual or group projects that focus on designing, developing, and implementing innovative solutions in areas such as irrigation systems, machinery design, and sustainable farming practices. Emphasis will be placed on project planning, resource management, and technical communication. Students will also engage in critical analysis and evaluation of their designs through feedback and peer review. By the end of the module, participants will gain valuable skills in project management and practical engineering applications within the agricultural sector.			

Module 50

Code	Course/Module Title	ECTS	Semester
PLN4370	PLANT NUTRITION	3	8
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	12
Description			
Through the "Plant Nutrition" module, students can be prepared with the ability to work in the field of plant nutrition and the use of fertilizers according to the modern scientific method. Through this course, the student will learn the most important nutrients that the plant needs and how to obtain them by studying the most important theories that explain how the plant absorbs these elements and their transformations within the plant. The student learns the importance of each plant's nutritional element and how to diagnose the symptoms of deficiency of these elements in the plant and process them. Introducing the student to the types of modern plant growth culture and methods of farming without soil using nutrient solutions. Enabling the student to learn the methods of taking plant samples, digesting and preparing them for chemical analysis, and the most important methods for measuring the plant's elemental content.			

Module 51

Code	Course/Module Title	ECTS	Semester
FET4630	FERTILIZERS TECHNIQUES	5	8
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	62
Description			
The "FERTILIZERS TECHNIQUES "module fast-changing time course qualifiers quickly after passing the most important nutrients and microelements and the use of teaching methods in assessing speed and knowing the quantity of time and science. The student also learns how to add chemicals and do quick calculations. based approaches in farming and research, in addition to learning about the most important factories that manufacture fertilizers and the units of these factories. The student also learns about the salt evidence for fertilizers and environmental problems and how to overcome these problems ،At the end of the course, new students will be in a fertile position in order to obtain a sufficient amount of production at the lowest cost.			

Module 52

Code	Course/Module Title	ECTS	Semester
LAR4640	LAND RECLAMATION	5	8
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	62

Description
The module “land reclamation” is concerned with knowing the type of land that needs to be reclaimed and determining the type of problem that limits the productivity of the land, whether it is saline or otherwise, such as gypsum, calcareous, sandy, acidic, or other problems that limit the productivity of agricultural land. Among the most important lands that the subject of land reclamation is concerned with are saline, sodic, and saline-sodic lands, and knowing the type of salts and the degree of salinity that the land suffers from. This subject is also concerned with knowing the type of reclamation that the land needs and how to get rid of the salts and reduce their concentration to the extent that allows the plant to grow satisfactorily, and knowing the type of washing that the land needs according to the type of salts and the weather conditions of the region, especially in terms of the amount of rain and temperature, and how to deal with the land after completing the reclamation process to preserve the land without the return or return of salts to it again, and enabling students to evaluate and describe soils affected by salinity according to scientific concepts and foundations to enter the agricultural sector with distinguished efficiency by participating in reclamation projects for lands affected by salts. Directing students towards a desire to obtain better experiences when applying for postgraduate studies.

Module 53

Code	Course/Module Title	ECTS	Semester
SOM4650	**SOIL MANAGEMENT**	5	8
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	62
Description			
The “Soil Management” module focuses on the evaluation of soil resources for optimal agricultural use. Students will learn how to evaluate soil properties to determine their suitability for different crops and cropping systems. The course covers topics such as soil suitability, cropland suitability, productivity, and sustainable management practices. Students will also be able to identify mathematical models for soil evaluation. By the end of the module, students will be able to design crop rotations and maximize productivity while maintaining soil health.			

Module 54

Code	Course/Module Title	ECTS	Semester
SWR4660	**SOIL ,WATER and PLANT RELATIONSHIP**	5	8
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	62

Description
The module “soil, water and plant relationship” enables the student to understand the nature of the relationship between the chemical properties of the soil (soil reaction, soil exchange capacity, soil salinity, soil solution) and the physical properties (soil depth, soil texture, soil structure, soil temperature, soil air) and its relationship to soil water and plant growth and yield. Through this course, the student will learn properties of water, water potential, its relationship to the soil, plant growth, the movement of water from the soil to the plant, and the factors affecting this movement. The student will also learn the importance of soil organic matter, its components, and its effect on the chemical and physical properties of the soil, and thus its effect on growth and yield Plant. The course enables the student to know how to deal with the problems of calcareous soils, saline soils, and sandy soils. In this course, the student learns methods for measuring some important characteristics, such as transpiration and water potential of soil and plant.

Module 55

Code	Course/Module Title	ECTS	Semester
SAT4310	**SMART AGRICULTURAL TECHNIQUES**	5	8
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	62
Description			
Smart Agricultural Techniques is a modern academic course designed to introduce students to the use of advanced technologies in enhancing agricultural practices and increasing productivity. It covers tools and systems such as precision agriculture, sensors, drones, and Big Data analytics. The course focuses on real-time monitoring and precise management of environmental variables like soil conditions, moisture, temperature, and crop growth. This enables efficient use of water, fertilizers, and pesticides, reducing costs while boosting crop yield. It also highlights the role of smart technologies in achieving sustainable agriculture, adapting to climate change, and ensuring food security. Students will explore both theoretical concepts and practical applications, supported by real-world case studies from smart farming initiatives globally.			

Module 56

Code	Course/Module Title	ECTS	Semester
AEP4292	**AGRICULTRUAL ENGINEERING PROJECT2**	2	8
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
0	3	47	3
Description			
The "Agricultural Engineering Project" module provides students with hands-on experience in applying engineering principles to solve real-world agricultural problems. Throughout the course, students will work on individual or group projects that focus on designing, developing, and implementing innovative			

solutions in areas such as irrigation systems, machinery design, and sustainable farming practices. Emphasis will be placed on project planning, resource management, and technical communication. Students will also engage in critical analysis and evaluation of their designs through feedback and peer review. By the end of the module, participants will gain valuable skills in project management and practical engineering applications within the agricultural sector.

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