epartment of Soil, Water, and Environment

Established in 1989, following the inception of the Faculty of Agriculture, the Department of Soil, Water, and Environment initially under the name of 'Department of Soil, Water, and Agricultural Mechanization.' Over time, the agricultural mechanization division became a separate department, and its name changed to 'Department of Soil and Water'. In 2016, the department's name was further modified to 'Department of Soil, Water, and Environment.' In 2020, the department's study programs were revised to align with Yemen's agricultural requirements and environmental context, ensuring the sustainable utilization of agricultural resources.

The Department of Soil, Water, and Environment holds a distinguished position due to its multifaceted approach, encompassing the study of soil science and reclamation, water science and irrigation, water quality and suitability for irrigation, environmental science and its relationship to soil, water, and plant resources, as well as its various impacts on human and animal health. Many qualified agricultural engineers specializing in land, water, and environmental sciences have graduated from this department.

The department offers diploma, bachelor's, master's, and doctoral degrees in soil, water, and environmental sciences. Students learn a range of important subjects in the following areas:

- Irrigation Water Management
- Land Management and Reclamation
- Agricultural Environmental Management
- Soil Fertility and Fertilization
- Agricultural Soils and Terraces Maintenance
- Agricultural Soil Surveying and Classification
- Evaluation of the Quality and Suitability of Water for Agricultural Irrigation and Drinking Purposes

Department Vision:

Achieving excellence locally and regionally in education, learning, scientific research, and community service in the fields of land, water, and environmental sciences and their applications.

Department Mission:

Leading in preparing specialized cadres in soil sciences and disseminating research through the updating and development of its programs in line with scientific and technological developments, advanced educational programs, and activities related to soil sciences and natural resources, and collaborating with other departments in the development of education and scientific research.

Program Mission

Contributing to the achievement of the faculty's mission of effectively managing natural resources for food security, sustainable agricultural development, and environmental preservation by preparing qualified cadres who can enhance agricultural productivity and serve the community through applied research focused on innovative solutions to societal problems in the agricultural field, particularly in the areas of soil and water resources.

Program Aims

1. Equipping graduates with comprehensive knowledge and skills in soil formation, classification, and maintenance, along with agricultural facility management, to enhance productivity and address agriculture-related issues.
2. Enabling graduates to effectively utilize modern techniques and analytical approaches in planning and implementing fertilization programs, utilizing soil and water resources, and managing agricultural waste to minimize pollution and ensure the production of environmentally friendly agricultural products.
3. Preparing graduates with the expertise to assess and manage soil and water resources, evaluating their suitability for irrigation, and conducting agricultural experiments to promote agricultural economic development while ensuring biodiversity conservation and resource sustainability.
4. Qualifying graduates with legal knowledge, social understanding, and professional ethics to discuss and understand issues related to agriculture in general and soil science in particular, and developing their self-learning and teamwork skills to design experiments, implement quality standards, write reports, and pursue postgraduate studies.

5. Providing the labor market with highly skilled cadres in reclaiming and cultivating desert or soils with problems, such as those affected by salinity, sodicity, and calcification, and effectively contributing to enhancing the productivity of agricultural lands under different environmental conditions and maintaining high soil fertility levels and preventing degradation.
6. Ensuring graduates are proficient in utilizing modern scientific methods for organic and biodynamic agriculture to achieve safe agricultural products, proposing various mineral, organic, and biodynamic fertilization programs, either individually or in an integrated manner, to optimize soil or water unit utilization while maintaining environmental sustainability.
7. Applying statistical principles and logical analysis to monitor and analyze soil and water resource-related problems and agricultural land defects, whether resulting from misuse or existing conditions, and developing appropriate solutions

Contributions of the Department to Community Service:

The Department of Soil, Water, and Environment has an analytical laboratory equipped with most of the chemical analysis devices, which enables it to play an effective role for students and the community. The department performs the following:

1. Providing consultations to relevant authorities in various specialized fields.
2. Conducting courses, research, and scientific studies, and actively participating in local and international scientific conferences and seminars.
3. Offering agricultural, environmental, and humanitarian consultancy services that contribute to enhancing food security and improving livelihoods.
4. Conducting environmental impact assessments of various agricultural projects.
5. Organizing specialized refresher and technical courses in soil and water sciences for staff members in government and private agricultural institutions.

- Conducting analyses for organizations, institutions, and individuals.
- Conducting analyses of chemical fertilizers to ensure their compliance with the established specifications and standards.
- Conducting chemical, physical, and biological analyses of soil to identify potential problems and proposing effective solutions to enhance its productivity.
- Conducting analyses of water samples from various sources, including surface water, groundwater, rainwater, and various wastewater streams such as greywater, sewage, agricultural, livestock, and industrial wastewater.

- Providing advice to stakeholders in the labor market on effective strategies to address problems arising from the use of analyzed water, rigorously assessing its quality and type, and determining its suitability for irrigation and drinking purposes.
- Conducting analyses of plants to diagnose and address problems related to their growth and productivity.

Graduate Attributes:

Upon successful completion of their studies, the graduates of the Department of Soil, Water, and Environment will be able to:

- Design, install, operate, and maintain state-of-the-art soil, irrigation, and environmental systems.
- Engage in self-learning and actively pursue knowledge.
- Effectively collaborate with colleagues as part of a team, carrying out assigned tasks with accuracy and integrity.
- Calmly find solutions to problems presented to them.
- Observe and easily detect changes, with the ability to analyze and compare.
- Propose crop cultivation plans tailored to environmental conditions, and soil and water quality.
- Develop research plans, collect, and analyze data under field and practical conditions.
- Design and conduct experiments, reaching logical conclusions.
- Cultivate crops resistant to biological and environmental stresses
- Effectively interact with team members and other individuals in the workplace.
- Manage soil, environment, water, and irrigation engineering practices.

Potential Career Opportunities for Graduates:

- Agricultural extension centers and irrigation and water equipment companies
- Crop production projects
- Specialist researcher in agricultural research centers and environmental research centers
- Assistant specialist in agricultural quarantine at land, air, and sea ports
- Assistant specialist in the Standards and Quality Authority
- Academic positions in universities after obtaining master's and doctoral degrees in this field
- Water and irrigation management engineer in agricultural consulting offices

Potential Employers for the Graduates:

- Ministry of Agriculture and Irrigation and Ministry of Water and Environment
- General Corporation for Water and Sanitation
- Agricultural Research Authority and Social Fund for Development
- Humanitarian organizations in the fields of food security, water, and civil society
- Small and Micro Enterprise Promotion Service (SMEPS)
- National Irrigation Program and Yemeni Standardization and Metrology Organization (YSMO)
- Agricultural departments in each of the following:
    - Capital Secretariat (Sana'a)
    - Governorate Offices
    - Cooperative & Agricultural Credit Bank (CAC Bank)
- Private agricultural companies
- Companies and stores selling fertilizers and agricultural inputs

Study Plan

The bachelor's degree program follows a semester system with two semesters each year, each lasting 16 weeks, including final exams. A bachelor's degree takes 8 semesters to complete. There are also clear rules and controls in place to determine the number of hours approved for study in the program, as well as the conditions for attendance, transfer, postponement of study, and withdrawal, in accordance with the Student Affairs Regulations, Supreme Council of Universities decisions, and any guides/regulations issued by the Ministry or Council, which are available to all stakeholders. The academic curriculum contains guidelines. Clear contains courses offered according to credit hours allocated into various components (requirements for colleges, universities, and specializations), as shown in Table 1.

Table (1) shows the ratio of specialization courses in the bachelor’s program (land, water, and environment) to the total of other courses (college requirements and college requirements)

Education system:		
• Number of hours needed to finish the section: • The distribution of hours and their proportion to the total number of program hours is as follows		
Credit hours	**Number of hours**	**Percentage of the total program hours**
University Requirements	12	14.9%
Faculty Requirements	51	34.4%
Department Requirements	--	---
Program Requirements	75	50.7%
total credit hours for the program	148	100%

Study Plan of Soil, Water and Environment Program

Undergraduate Program Courses for Departments of the Faculty of Agriculture, Foods, and Environment - First and Second Levels

First Level Courses					
First Semester			**Second Semester**		
Course code	**Course Title**	**Credit Hours**	**Course code**	**Course Title**	**Credit Hours**
UR001	Arabic Language (1)	**2**	FR001	Physics & Meteorology	3
UR006	Islamic Culture	**3**	FR006	Principles of Statistics	2
FR111	General Chemistry	**3**	FR111	Organic Chemistry	3
FR112	General Botany	**3**	FR112	Principles of Agricultural Economics	2
FR113	Mathematics	**2**	FR113	General Zoology	3
FR114	**Agriculture in Yemeni Environment**	**1**	FR114	Principles of Ecology	2
UR007	National culture	**2**	UR002	Arabic Language (2)	2
FR115	Geology	**1**	UR008	Conflict with the Israeli enemy	2
	Total	17		Total	19

Undergraduate Program Courses for Departments of the Faculty of Agriculture, Foods, and Environment - First and Second Levels

Second Level Courses					
First Semester			Second Semester		
Course code	Course Title	Credit Hours	Course code	Course Title	Credit Hours
FR211	Soil Fundamentals	2	FR221	Principles of Food Science	2
FR112	General Microbiology	3	FR222	Principles of Crops Protection	2
FR113	Biochemistry	3	UR004	English Language (2)	2
FR114	Principles of Animal Production	2	FR127	Principles of Genetics	2
UR003	English Language (1)	2	FR223	Principles of Horticulture	2
FR114	Principles of Crops Production	2	FR224	Plant Physiology	2
FR215	Principles of Agricultural Engineering	2	FR225	Principles of Human Nutrition	2
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	Total	16		Total	17

Undergraduate Courses for the Soil, Water, and Environment Program (SOL) - Department of Soil, Water, and Environment

Third Level Courses					
First Semester			Second Semester		
Course Code	Course Title	Credit Hours	Course Code	Course Title	Credit Hours
SOL311	Soil Pedology	3	SOL321	Soil and water Pollution	3
SOL312	Soil Chemistry	3	SOL322	Soil, water and plant Relationships	2
CRP318	General Crop Production	2	SOL323	Hydrology	2
SOL313	Basic Irrigation	3	SOL324	Analytical Chemistry	2
ETA315	Surveying and Land Leveling	3	HRT414	Design and Landscape Gardening	3
FR315	Agricultural Extension & Rural Community	2	SOL325	Fertility and Fertilization	3
SOL314	Soil Physics	3	SOL326	Integrated Water Resources Management	2
			SOL327	Summer Training	1
	Total	19		Total	18

Fourth Level Courses					
First Semester			Second Semester		
Course Code	Course Title	Credit Hours	Course Code	Course Title	Credit Hours
SOL411	Soil microbiology	3	SOL421	Plant nutrition	3
SOL412	Land reclamation and improvement	3	SOL422	Water suitability for irrigation	2
AEC424	Economics of natural resources	2	ETA424	Design and operation of modern irrigation systems	3
SOL413	Soil minerals	3	SOL423	Environmental Impact Assessment	3
SOL414	Fertilizers and fertilization	3	SOL424	Water harvesting technology	3
SOL415	Spate (Sail) irrigation	3	SOL425	Survey & Classification of Yemen Soils	2
CRP322	Design and analysis of agricultural experiments	3	SOL426	Conservation of agricultural lands and terraces	3
			SOL427	Graduation Projects	1
	Total	20		Total	20