Environmental Sciences Master's Program Specification Document

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Faculty: Faculty of Petroleum and Natural Resources
Program: Master of Environmental Science

Team for preparing the proposal for the program development project:

No.	Name	Designation
1	Prof. Hisham Mohammed H. Nagi	Program Coordinator
2	Associate Prof. Bassim Shaif Al-Khirbash	Program Development Member
3	Associate Prof. Akram Qadri Al-Qirshi	Program Development Member
4	Dr. Abdulwasea Al-Qadsi	Representative from the Academic Development and Quality Assurance Center
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Contents

University:	Sana'a University	Faculty	Faculty of Petroleum and Natural Resources

Development of the Master's Program in Environmental Sciences

Introduction

The Department of Environmental Sciences was established in September 2019, concurrent with the establishment of the Faculty of Petroleum and Natural Resources at Sana'a University. Previously, the department operated as the Environment Division within the Department of Earth and Environmental Sciences at the Faculty of Science, Sana'a University. This establishment was necessitated by the growing market demand for graduates equipped with expertise in contemporary environmental issues, the ability to address current environmental challenges, and the capacity to formulate future strategies to mitigate the adverse environmental impacts of escalating human activities in the Republic of Yemen. In designing the undergraduate and postgraduate (master's) programs for the department, utmost attention was paid to equipping graduates with the competencies required to fulfill their responsibilities in environmental management. This aligns with the advancements witnessed in this field in other regional and global countries, enabling graduates to compete effectively in the labor market alongside their counterparts from comparable universities. In addition, graduates are empowered to raise environmental awareness among Yemeni society members.

The Master's program is designed to enable graduates of the department to earn a Master's degree in science upon successful completion of coursework over two semesters, totaling 30 credit hours. Subsequently, they must register for a Master's thesis, worth 6 credit hours, to complete the requirements for the Master of Science degree in Environmental Sciences. The team tasked with developing the Master's program ensured that the graduate students acquire all the necessary information, practical and applied skills that qualify them to conduct various environmental assessments. This equips them to compete and succeed in the environmental job market, as well as in general employment opportunities related to this field, in accordance with global quality standards. These qualifications serve as a springboard for a wide range of career opportunities and postgraduate research pursuits (PhD).

Justifications for Developing the Program

The primary justifications for developing a master's program in environmental sciences can be summarized as follows:

- Developing a program that adheres to modern quality standards.
- Developing a program that is competitive with other specialized graduate programs in environmental sciences.
- Developing qualified cadres that can compete successfully in the job market.
- Developing a program that equips graduate students to successfully pursue doctoral studies.



Faculty of Petroleum and Natural Resources **Faculty:** **Sana'a University** **University:**

Environmental Sciences Master's Program Specification

Basic Information about the Program

1	Program Title and Final Award	Environmental Sciences Program (M.Sc.)
2	Awarding Body/Institution	Faculty of Petroleum and Natural Resources
3	Teaching Institution/ Responsible Department	Department of Educational Sciences
4	Other Departments Involved in Teaching the Program:	Department of Geosciences
5	Medium of Instruction:	English
6	Program Start Year	2021
7	Study Mode	(Full-time) Regular
8	Master's Program Type	Coursework and Thesis
9	Place of Study:	Sana'a University
10	System of Study:	Credit Hour System
11	Duration of the Program:	At least two years (four semesters)
12	Possible Future Career Options for Graduates:	Environmental Engineer
13	Levels of Award/ Final Award:	The student is granted a diploma in environmental sciences if he/she completes the coursework without a thesis.
14	Prerequisite Qualifications:	Bachelor's degree in scientific disciplines (science + agriculture + engineering + medicine) or equivalent.
15	Required GPA/ Grade for Admission:	The applicant must have at least a good grade in the bachelor's degree.
16	Other Requirements:	The applicants must pass the GPA improvement program for students with a pass grade in the bachelor's degree.
17	Program Coordinator:	Associate Prof. Hisham Mohammed H. Nagi
18	Date of Program Specification/ Latest Accreditation:	----

University Vision, Mission, and Aims

▪ University Vision

Sana'a University (SU) aspires to achieve a national leading role in teaching, learning, scientific research and community service; and to be among the best regional universities and the foremost house of expertise and think tank in Yemen.

▪ University Mission

To contribute to the sustainable development efforts by providing an accredited higher education environment and excellent research services within a fruitful national partnership based on transparency, professionalism and creativity.

▪ University Aims

Sana'a University aims to:

1- To provide specialized and in-depth academic opportunities for students in different fields of knowledge to meet the country's needs of specialists, technicians and experts.
2- To cherish Arabic language, its teaching and development; and mainstream its use as the language of science and education in various arenas of knowledge, as a vehicle for cultural meanings, values and ethics of the Arab-Islamic civilization.
3- To develop knowledge through engaging in multidisciplinary research, both individually and collectively, and directing them towards serving the community needs and development plans.
4- To nurture the development of technology and its utilization in the community development.
5- To promote the activities of authorship, translation and publishing in various fields of knowledge with special emphasis on the Yemeni heritage.
6- To contribute to the promotion of arts, literature and the advancement of sciences.
7- To offer an academic atmosphere conducive to the freedom of thought, expression and publication in a way that does not contradict with the lofty values and elevated ideals of Islam.
8- To strengthen relations with universities and public and private institutions in the country to ensure a mutual and constructive interaction of knowledge, expertise, resources and participation that will guarantee effective contribution to the comprehensive development of the country.
9- To strengthen scientific and cultural ties with Arab and foreign universities, scientific bodies, and research and development centers, with a view to developing Sana'a University and enhancing its prominence.
10- To offer technical and specialized studies and consultations for various public and mixed-sector institutions.
11- To contribute to the development of policies and ways of work in institutions of both public and private sectors, providing models and innovative experiments to solve various problems.
12- To promote the efficiency of employees in public and private institutions and agencies, by contributing to the development of in-service preparation and qualification programs.

Faculty Vision, Mission, and Aims

- **Faculty Vision**

Attaining local leadership and regional excellence in the field of petroleum and natural resources sciences and contributing to sustainable development.

- **Faculty Mission**

Preparing qualified cadres in the field of petroleum and natural resources, capable of competing in the local and regional labor market, by providing distinguished educational, research, and community services in a stimulating learning environment that encourages creativity and innovation.

- **Faculty Aims**

1- Providing high-quality education to keep pace with the developments in the fields of petroleum and natural resources;
2- Qualifying specialized, highly proficient graduates capable of competing in local, regional, and global markets;
3- Building capacities and attracting specialized teaching staff to enhance educational performance;
4- Promoting partnerships with relevant institutions and companies;
5- Contributing to community service and providing consultations and technical and research studies.

Department Mission and Aims

- **Department Mission:**

Preparing and equipping highly competent cadres with scientific expertise to keep pace with advancements in the field of environmental science, as well as professional skills to compete effectively in the labor market and meet the needs of society in various environmental sectors.

- **Department Aims**

The department aims to:

1- Providing state institutions with specialized cadres capable of effectively contributing to the monitoring, conservation, and problem-solving of Yemen's environment.

2- Conducting environmental studies and research and providing consultations in this field to various institutions and related sectors.
3- Contributing to spreading environmental culture and awareness among all segments of Yemeni society through diverse means.
4- Building academic and research bridges that embody collaborative cooperation between the department and its counterpart departments locally, regionally, and internationally.
5- Developing academic programs and scientific research for postgraduate students.

Program Mission and Aims:

- **Program Mission**

Cultivating graduates capable of contributing to the planning, development, and practice of their specialization at a high professional level through applied research and advanced studies, and qualifying experts to assume leadership roles in various environmental fields.

- **Program Aims**

The program aims to:

1- Enhance students' understanding and awareness of environmental issues and natural resources.
2- Strengthen students' capacity to preserve and protect the environment within the framework of sustainable development.
3- Equip students to conduct scientific research in environmental sciences, efficiently and methodically, at both the master's and doctoral levels.
4- Contribute to the development of a cadre capable of managing development projects and assessing their environmental impacts in a manner that preserves surrounding ecosystems.

Program Standards & Benchmarks

Program Standards

There are no national standards for the environmental sciences program.

Program Benchmarks

- Yemeni Universities Law No. 17 of 1995
- Executive Regulations of Law No. 32 of 2007
- Prime Minister's Decision No. 40 of 2008 regarding the Postgraduate Studies System in Yemeni Universities
- Standards of Postgraduate Programs issued by the Council for Accreditation and Quality Assurance
- Academic Program and Course Specification Forms issued by the Council for Accreditation and Quality Assurance.
- National Vision for Building a Modern Yemeni State

Similar Reference Programs:

1. Master's Program in Environmental Sciences - Qatar University
2. Master's Program in Environmental Studies - Alexandria University.
3. Master's Program in Environmental Sciences and Management - University of Jordan.
4. Master's Program in Environmental Sciences and Natural Resources - Arabian Gulf University.
5. Master's Program in Environmental Sciences - York University.
6. Master's Program in Environmental Sciences - New Jersey Institute of Technology.

Annex (1) Academic Standards of the Program for an International Accreditation Board
Annex (2) A Survey of Similar Reference Programs.
Annex (3) A Survey of Learning Outcomes for Similar Reference Programs and Alignment with Current Program Outcomes
Annex (4) A Survey and Alignment of Aims of Similar Reference Programs with the Current Program Aims
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A Survey Summary of Comparable Benchmark Programs to the Current Program

Required Data	Similar Reference Programs						Current Program
	First Program	Second Program	Third Program	Fourth Program	Fifth Program	Sixth Program	
Program Title:	Master of Science in Environmental Sciences	Master of Science in Environmental Sciences	Master of Science in Environmental Sciences	Master of Science in Environmental Studies	Master of Science in Environmental Sciences and Management	Master of Science in Environmental Sciences and Natural Resources	Master of Science (M.Sc.) in Environmental Sciences
Faculty/Center/Institute Name:	==	Faculty of Arts and Sciences	College of Science and Liberal Arts	Institute of Graduate Studies and Research	Faculty of Sciences	College of Graduate Studies	Faculty of Petroleum and Natural Resources

University:	University of York	Qatar University	New Jersey Institute of Technology	Alexandria University	University of Jordan	Arabian Gulf University	Sana'a University
Country Name:	United Kingdom	Qatar	USA	Egypt	Jordan	Bahrain	Republic of Yemen
System of Study	Coursework and thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis
Study Mode	(Full-time) Regular	(Full-time) Regular	(Full-time) Regular	(Full-time) Regular	(Full-time) Regular	(Full-time) Regular	(Full-time) Regular
Number of Semesters	Full year (4 semesters)	Full year (4 semesters)	N/A	Two semesters	Two semesters	Two semesters	Two semesters
Total Credit Hours	100 C.H.	25 C.H.	30 C.H.	30 C.H.	33 C.H.	36 C.H.	30 C.H.
Total Credit Hours for Compulsory Courses	50 C.H.	13 C.H.	15 C.H.	26 C.H.	18 C.H.	--	30 C.H.
Total Credit Hours for Elective Courses	50 C.H.	12 C.H.	9 C.H.	4 C.H.	6 C.H.	--	--
Number of Compulsory Courses	4 Core Modules	5	5	--	6	--	12
Number of Elective Courses	8 Core Modules	4	3	--	2	--	--
Existence of additional prerequisite courses for program admission and their number	--	--	--	--	--	--	--
Number of credit hours for the thesis	80 C.H.	9 C.H.	6 C.H.	6 C.H.	9 C.H.	8 C.H.	6 C.H.
Number of credit hours	180 C.H.	34 C.H.	36 C.H.	36 C.H.	42 C.H.	44 C.H.	36 C.H.
Specified duration for thesis completion	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Minimum duration for program completion	N/A	24 months	N/A	N/A	N/A	N/A	2 years
Maximum duration for program completion	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Program Intended Learning Outcomes (PILOs)

First: Knowledge and Understanding:	
	Upon successful completion of the program, the graduates will be able to:
A1.	Demonstrate a sound knowledge and understanding of the principles and concepts of environmental sciences and related disciplines.
A2.	Accurately identify the laboratory and field tests required to conduct environmental studies.
A3.	Explain environmental problems and issues at both national and global levels, proposing appropriate solutions.

Second: Cognitive/ Intellectual Skills	
	Upon successful completion of the program, the graduates will be able to:
B1.	Explain the natural processes that shape the natural world and the impact of human activities on these processes.
B2.	Propose the best effective solutions for addressing environmental problems.
B3.	Plan effectively for the sustainable utilization of natural resources.

Third: Practical and Professional Skills	
	Upon successful completion of the program, the graduates will be able to:
C1.	Collect, analyze, and utilize environmental data and information to write scientific and methodical reports.
C2.	Select effective solutions to address various environmental issues and problems faced by society.
C3.	Efficiently manage environmental departments, projects, and natural resources.
C4.	Design strategic and implementation plans for environmental science projects, adhering to methodological principles.

Fourth: General and Transferable Skills:	
	Upon successful completion of the program, the graduates will be able to:
D1.	Communicate effectively with colleagues and surrounding community, expressing ideas clearly and objectively.
D2.	Negotiate with decision-makers and other stakeholders about how to preserve and protect the environment.
D3.	Review current environmental laws and policies and contribute to their amendment when necessary.
D4.	Work positively within a team, leveraging information and communication technology and other resources to self-develop professionally and academically.
Annex (7): Alignment of Program Aims with the Program Intended Learning Outcomes (PILOs).	

Annex (8) Attributes of the Program Graduates and Career Opportunities.
Annex (9) Alignment of PILOs with the National Academic Reference Standards (NARS).
Annex (10) Alignment of PILOs with International Reference Standards.

Program Structure

The program structure consists of the following requirements:

Requirements	Number of Courses	Credit Hours	%
Complementary Courses (if any)	N/A	--	--
Compulsory Courses	12	30	83%
Elective Courses (if any)	N/A	--	--
Thesis	1	6	17%
Field Training (if any)	N/A	--	--
Others	--	--	--
Total		36	17.00%

The program structure requirements are detailed below:

First: Complementary Courses (if any)

Not applicable

Second: Elective Courses (Cr.H 30)

	Course Title		COURSE CODE	CREDIT HOURS				Pre-Requisites
				Theoretical	Practical	Tut./Semi	Total C.H	
1	Applied Environmental Science		MEN101	2	0	0	2	
2	Environmental Biology		MEN102	3	0	0	3	
3	Environmental Chemistry		MEN103	3	0	0	3	
4	Environmental Geology		MEN104	3	0	0	3	
5	Energy and Climate Change		MEN105	2	0	0	2	
6	Environmental Statistics		MEN106	2	0	0	2	
7	Environmental Pollution and Toxicology		MEN201	3	0	0	3	
8	Biodiversity		MEN202	3	0	0	3	

9	Sustainable Development and EIA		**MEN203**	**3**	**0**	**0**	**3**	
10	Solid Waste Management and Monitoring		**MEN204**	**2**	**0**	**0**	**2**	
11	Remote Sensing and GIS		**MEN205**	**2**	**0**	**0**	**2**	
12	Research Project and Seminar		**MEN206**	**1**	**0**	**1**	**2**	
Total credit hours							**30**	

Third: Elective Courses

Not applicable

Fourth: Thesis

The student is required to write and defend a scientific thesis, carrying a weight of six credit hours.

Curriculum Map:

Curriculum Map (Alignment of Course Intended Learning Outcomes (CILOs) to the Program Courses)

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Annex (10) Alignment of Program Courses with PILOs (Curriculum Map Matrix)

The following table illustrates the Curriculum Map of the Program

Courses	Program ILOs																	
	A1	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**C1**	**C2**	**C3**	**C4**	**C5**	**D1**	**D2**	**D3**	**D4**
Applied Environmental Science	1	0	1	0	0	1	0	0	0	0	1	1	1	0	1	0	0	1
Environmental Biology	1	1	0	0	0	1	0	0	0	0	1	0	1	0	1	0	0	1
Environmental Chemistry	1	1	1	0	0	1	0	0	0	0	1	0	1	0	1	0	0	1
Environmental Geology	1	0	0	0	0	1	0	0	0	0	1	0	1	0	1	0	0	1
Energy and Climate Change	1	0	1	0	0	1	1	1	0	0	1	0	0	0	1	1	0	1
Environmental Statistics	1	1	0	0	0	0	0	0	0	1	1	0	1	0	1	1	0	1

Courses	Program ILOs																	
	A1	A2	A3	A4	A5	B1	B2	B3	B4	C1	C2	C3	C4	C5	D1	D2	D3	D4
Environmental Pollution and Toxicology	1	1	1	0	0	1	1	0	0	1	1	1	1	0	1	1	1	1
Biodiversity	1	1	1	0	0	1	1	1	0	1	1	1	1	0	1	1	1	1
Sustainable Development and EIA	1	1	1	0	0	1	1	1	0	1	1	1	0	0	1	1	1	1
Solid Waste Management and Monitoring	1	1	1	0	0	1	1	0	0	1	1	1	1	0	1	1	1	1
Remote Sensing and GIS	1	1	0	0	0	1	1	0	0	0	1	0	1	0	1	1	0	1
Research Project and Seminar	1	0	1	0	0	1	1	1	0	1	1	1	1	0	1	0	1	1

Teaching Strategies:

No.	Teaching Strategy	Description of Usage
1	Interactive Lectures	They emphasize reciprocal face-to-face interactions, group processing, social skills development, positive interdependence, and individual accountability.
2	Seminar	Students are assigned to research a specific topic and are then evaluated on the presentation of their findings.
3	Discussion and Debate	An issue or topic is presented, followed by an exchange of different opinions and a discussion between students and the lecturer. The lecturer then provides feedback on the accuracy of the points raised and summarizes the key points.
4	Problem-Solving	Students are trained in scientific and logical thinking skills by being presented with unfamiliar problems or situations that challenge their cultural framework. They are then guided to develop solutions through reflection, research, and discussion under the supervision of the lecturer.
	Practical Demonstrations	Students are tasked with conducting experiments, writing reports on their findings, and discussing the results.
	Field Training	Field trips to entities related to environmental specializations.

Alignment of Teaching Strategies with Program Learning Outcomes

Teaching Strategy	Program ILOs																
	A1	A2	A3	A4	A5	B1	B2	B3	B4	C1	C2	C3	C4	C5	D1	D2	D3	D4
Interactive Lectures	✓	✓	✓			✓		✓		✓	✓	✓			✓	✓		✓
Group Discussion	✓	✓	✓			✓	✓	✓		✓	✓	✓	✓		✓	✓	✓	✓
Seminar	✓		✓			✓	✓	✓		✓	✓		✓		✓	✓	✓	✓
Discussion and Debate	✓	✓	✓			✓	✓	✓		✓	✓	✓	✓		✓	✓	✓	✓
Brainstorming																		
Simulation																		
Practical Demonstrations	✓	✓	✓			✓	✓	✓		✓	✓	✓	✓		✓	✓	✓	✓
Problem-Solving																		
Practical Application Practical in Lab																		
Self-Learning																		
Cooperative learning																		
Tasks and Assignments																		
Case Study																		
Field training	✓	✓	✓			✓		✓		✓			✓		✓			✓

Assessment Strategies:

No.	Assessment Strategies:	Description (courses in which it is used and frequency of use)
1	Written Exams	They serve as a valuable method to assess the students' comprehension and understanding of the theoretical and practical topics covered in the courses through written answers to questions on midterm or final exams.
2	Oral Exams	----
3	Quizzes	----------

4	Practical Exams	For the professional skills courses that involve a laboratory, the use and control of equipment, or the development of physical and psychomotor dexterity skills, it is evident that such work must be assessed through practical experiments of some kind. There are two methods of practical assessment: 1. Continuous Observation: *Continuous observation* stands as the preferred method for courses emphasizing practical or motor skills, which constitute the majority of intended learning outcomes. By assessing each performance or product, instructors can attain a more comprehensive understanding of student performance and capabilities. In addition, timely and immediate feedback can be provided for improvement purposes whenever possible. This type of formative continuous assessment is particularly well-suited for practical skills courses. 2. Formative Presentation: This method involves demonstrating practical skills to an examiner. This assessment method resembles written closed-book exams in many respects, albeit with a practical orientation. However, it may pose challenges for students prone to test anxiety. Yet, many professional qualifications necessitate proficiency tests of this nature, underscoring the importance of thorough student preparation.
	Others	

Alignment of Assessment Strategies with Program Learning Outcomes

Assessment Strategy	Program ILOs																	
	A1	A2	A3	A4	A5	B1	B2	B3	B4	C1	C2	C3	C4	C5	D1	D2	D3	D4
Written Exams	✓	✓	✓			✓	✓	✓		✓	✓	✓	✓		✓	✓	✓	✓
Quizzes																		
Oral Exams																		
Practical Exams	✓	✓	✓			✓	✓	✓		✓	✓	✓	✓		✓	✓	✓	✓
Observation of Performance																		
Assessment of Reports																		
Portfolio																		

System of Study

Program Type	Coursework and Thesis

Study Mode	Full time (regular)		
Program Duration	**Min.**	2 years	
	Max.	N/A	
Total Credit Hours Required for Program Completion (coursework and thesis)	(36) Cr. Hours		

Annex (11) Coding of Program Courses and Alignment with PILOs (Curriculum Map Matrix)
Annex (12) Program Study Plan
Annex (13) Description of the Program's Courses

Program Study Plan

First Semester

	Course Title		COURSE CODE	CREDIT HOURS				Pre-Requisites
				Th.	Pr.	Tut./ Semi	Total C.H.	
1	Applied Environmental Science		MEN101	2	0	0	2	
2	Environmental Biology		MEN102	3	0	0	3	
3	Environmental Chemistry		MEN103	3	0	0	3	
4	Environmental Geology		MEN104	3	0	0	3	
5	Energy and Climate Change		MEN105	2	0	0	2	
6	Environmental Statistics		MEN106	2	0	0	2	
	Total Credit Hours						15	

Second Semester

	Course Title		COURSE CODE	Credit Hours				Pre-Requisites
				Th.	Pr.	Tut./ Semi	Total C.H.	
1	Environmental Pollution and Toxicology		MEN201	3	0	0	3	
2	Biodiversity		MEN202	3	0	0	3	
3	Sustainable Development and EIA		MEN203	3	0	0	3	
4	Solid Waste Management and Monitoring		MEN204	2	0	0	2	
5	Remote Sensing and GIS		MEN205	2	0	0	2	
6	Research Project and Seminar		MEN206	1	0	1	2	
	Total Credit Hours						15	

Course Title	COURSE CODE	CREDIT HOURS
Thesis	—	6

Admission Requirements for the Program

Eligible Specializations:	Bachelor's degree in one of the following scientific disciplines (Science + Engineering + Agriculture + Medicin
Eligible Specializations:	
English Language Proficiency Requiremen TOEFL / IBT	
Computer Skills (ICDL)	
Other Requirements:	Applicants must successfully pass the admission exam and interview.

Graduation Requirements:

Total required credit hours for graduation:
Minimum Passing Grade for Each Course
Total marks or overall grade required for graduation:

Grading System

Grading System:
From 90% to 100% of total marks: Excellent
From 80% to less than 90%: Very Good
From 75% to less than 80%: Good
From 65% to less than 75%: Pass
Less than 65%: Poor/Fail
Student must the minimum score for the average of all courses is 75% degree
The minimum average grade required for all courses must be 75%.

Learning Resources, Facilities, and Equipment for Program Implementation.

Learning Resources

Books, references, and other reference materials, including electronic internet resources, etc.
Facilities and Equipment
Library, laboratories, equipment, apparatus, materials, medical or engineering facilities, classrooms, etc.

Teaching staff

	Professor	Associate Professor	Assistant Professor
Required staff	-	**6**	-
Available Staff	**2**	**4**	-
Note:	The department may seek assistance from specialized professors in the faculties of ..... at Sana'a University.		

Names of Teaching Staff in the Department

No.	Name	Academic Qualification	Academic Rank
1.	Prof. Nabeel Abdo Ahmed Al-Shawafi	Ph.D.	Prof.
2.	Prof. Hisham Mohammed H. Nagi	Ph.D.	Professor
3.	Associate Professor Akram Qadri Al-Qirshi	Ph.D.	Associate Professor
4.			
5.			

Program evaluation and improvement

Evaluation Areas/Aspects	Evaluation Methods	Evaluation Time	Sample



Courses Description

Applied Environmental Science — MEN101

The course aims to introduce the student to the basics of environmental science and its various applications and to identify the environmental issues of global concern at the present time.

Environmental Biology — MEN102

The aim of this course is to provide students with detailed information related to the organization and structure of living organisms and the interaction of living things with each other and with the ecological systems in which they live. It also aims to provide students with detailed knowledge relevant to the biosphere, its various divisions, the characteristic properties of terrestrial and aquatic ecosystems, the associated living components, and the negative impacts of human beings on them.

Environmental Chemistry — MEN103

This course introduces the basic concepts and principles of environmental chemistry sciences, such as its definition, divisions, and importance. It describes the relationship between chemistry and the environment and summarizes the major present environmental problems and the ways to solve them.

Environmental Geology — MEN104

This course focuses on the fundamentals of physical geology, including rock types, mineral identification, plate tectonics, etc., with an emphasis on human interaction with the environment. We will explore natural processes and anthropogenic (human-impacted) effects on those processes in the context of natural hazards, natural resources, and sustainability.

Energy and Climate Change — MEN105

The aim of this course is to identify various energy sources, whether traditional or non-traditional, to determine their environmental impacts, manage them in a way that does not harm the environment, and explore the relationship between energy usage and climate change. In addition, it aims to equip students with the knowledge of basic climate change concepts, its causes and consequences on various environmental aspects, adaptation strategies to climate change, and methods to prevent its exacerbation.

Environmental Statistics **MEN106**

This course provides students with a set of topics that benefit the environment program, including basic concepts in statistics, experimental design and analysis, and minimizing experimental errors by selecting appropriate designs and statistical methods for environmental research. It covers data recording, organization, computer entry, data interpretation, methods for displaying averages, as well as correlation analysis, regression, and tests.

Environmental Pollution and Toxicology **MEN201**

This course aims to introduce students to the basic concepts and basics of environmental pollution and toxicology, including definitions, sections, and the significance of environmental chemistry. It also provides students with crucial information in the field of environmental chemistry sciences, explaining the relationship between environmental pollution and toxicology. Furthermore, the course sheds light on the most critical issues related to environmental pollution and toxicology, along with ways to solve them.

Biodiversity **MEN202**

The aim of this course is to provide students with detailed information related to biodiversity, its importance, measurement, conservation, and sustainable use. It also aims to show the relationship between biodiversity and human health, as well as the overall health of ecological systems. It will also explore the connection of biodiversity with biotechnologies, emphasize the significance of managing genetic resources, and highlight the proper utilization of these resources.



Sustainable Development and EIA **MEN203**

The aim of this course is to introduce students to sustainable development, its goals, and the importance of these goals for the well-being of people worldwide without harming the natural environment. The course also aims to familiarize students with the methodology of the environmental impact assessment (EIA) process to achieve sustainable development.

Solid Waste Management and Monitoring **MEN204**

The topics covered in this course include the generation, processing, and disposal of municipal, industrial, and agricultural waste materials. It also addresses emerging issues such as zero waste, producer responsibility, and life cycle assessment. These topics are approached from technical, economic, and environmental perspectives, with a focus on beneficial reuse and resource recovery rather than traditional waste management. The course also highlights the interdisciplinary nature of this field and its increasing emphasis on sustainability through discussions, exercises, and projects.

Applications of Remote Sensing and GIS **MEN205**

Introduction to the theory and application of using color, infrared, thermal, and RADAR images generated from satellite and aerial photographs for geographic, geologic, environmental, and planning purposes. Introduction to the theoretical and practical understanding of fundamental GIS concepts, capabilities, and applications with an emphasis on the nature of geographic data, data input issues, data models, database design, spatial analysis, and data output. Utilization of ArcGIS software to address research problems in various disciplines.

Research Project and Seminar **MEN206**

The aim of this course is to provide students with detailed information related to the principles of scientific research, its importance, tools, and goals. It also covers scientific methods of inquiry, conducting and writing scientific research. Furthermore, the course aims to equip students with comprehensive knowledge about software programs and equipment for

scientific presentations, as well as preparing and presenting seminars effectively.

Annexes

- Annex (1)Academic Standards of the Program for an International Accreditation Board
- Annex (2) A Survey of Names of Similar Reference Programs
- Annex (3) A Survey of Learning Outcomes for Similar Reference Programs and Alignment with Current Program Outcomes
- Annex(4) A Survey and Alignment of Aims of Similar Reference Programs with the Current Program Aims
- Annex (5) A Survey of Credit Hours of Similar Reference Programs
- Annex (6) A Survey of Courses in Similar Reference Programs
- Annex (7) Alignment of Program Aims with the Program Intended Learning Outcomes (PILOs)
- Annex (8) Attributes of the Program Graduates and Career Opportunities.
- Annex (9) Alignment of PILOs with the National Academic Reference Standards (NARS) (if applicable).
- Annex (10) Alignment of PILOs with International Reference Standards
- Annex (11) Coding of Program Courses and Their Alignment with PILOs (Curriculum Map Matrix)
- Annex (12) Program Study Plan
- .Annex (13) Description of the Program's Courses
- Annex (14) Teaching Staff Involved in Developing the Program Specification Document.

Annex (1)Academic Standards of the Program for an International Accreditation Board

The Committee of Heads of Environmental Sciences (CHES)

https://www.the-ies.org/accreditation

The Committee of Heads of Environmental Sciences (CHES) is the collective voice of the environmental sciences and related disciplines in higher and further education. Founded in 1991, CHES plays a leading role in the Higher and Further Education environmental science communities, representing member interests and lobbying on their behalf. In 2012 CHES merged with the Institution of Environmental Sciences (IES) and acts as the education committee of the IES.

CHES is an active networking organization and enhances the quality of outcomes for all colleagues and institutions throughout environmental education. We aim to facilitate cooperation and collaboration between relevant bodies within the UK and internationally.

The Objective of CHES

The object of CHES is to support and promote the advancement of environmental sciences teaching, learning, research, knowledge exchange and scholarship in the Higher and Further Education sectors both in the UK and internationally. CHES is a subcommittee of the Institution of Environmental Sciences (IES) and is subject to its Memorandum of Articles and Byelaws. In discharging its object CHES will:

- act as the collective voice of the environmental sciences academic community;
- promote and facilitate collaboration, co-operation and the articulation of a common voice for and on behalf of the Schools / Departments of Environmental Science;
- work with like-minded national and international organizations in pursuit of common goals where such collaboration might reasonably be expected to result in the furtherance of the object of CHES;
- serve as a peer-pressure group to enhance quality of outcomes in the environmental sciences; and undertake such actions as are agreed as policy by the Annual General Meeting and as strategy to deliver the policy as agreed by the Executive Committee.

Name of Accreditation Body:	**Eco Canada Accreditation (Eco Canada)**
Year of Standards Issuance:	**-----**
Website link:	**https://www.the-ies.org/accreditation**

Standards

No.	Description
1	Environmental program development and maintenance
2	Environmental Program Curriculum
3	Faculty complement
4	Admissions
5	Student services
6	Institution facilities and learning resources
7	Program Financial Resources
8	Research & Scholarly Activity
9	

Name of Accreditation Body:	**Middle State Commission on Higher Education (MSCHE)**
Year of Standards Issuance:	**-----**
Website Link	**https://www.msche.org/standards/**

Standards

No.	Description
1	Mission and Aims
2	Ethics and integrity
3	Design and Delivery of the Student Learning Experience
4	Support of the Student Experience
5	Educational Effectiveness Assessment
6	Planning, Resources, and Institutional Improvement
7	Governance, Leadership, and Administration
8	

Annex (2) A Survey of Names of Accredited Reference Programs Similar to the Current Program

Course Title		University	College/center/institute	Department	Country	Program Accrediting Body	Degree Awarded at Program Completion	Year of Accreditation
First Program	Environmental Science and Management	University of York	==	Environment and Geography	UK	CHES/IES	M.Sc.	
Second Program	Environmental Science	The University of Sydney	==	==	Australia		M.Sc.	
Third Program	Environmental Science	Qatar University	College of Arts and Sciences	Biological and Environmental Sciences	Qatar	CHES/IES	M.Sc.	2012
Fourth Program	Environmental Science	Bangalore University	==	Environmental Science	India	NAAC	M.Sc.	2016
Fifth Program	Environmental Studies	Alexandria University	Institute of Graduate Studies and Research	==	Egypt		M.Sc.	
Sixth Program	Environmental Sciences and Management	University of Jordan	Faculty of Sciences	Geology	Jordan		M.Sc.	
Seventh Program	Environmental Sciences and Natural Resources	Arabian Gulf University	College of Graduate Studies	==	Bahrain	CHES/IES	M.Sc.	

Eighth Program	Environmental Monitoring and Assessment	University of Southampton	Faculty of Geography and Environmental Sciences	==	UK	CHES/IES	M.Sc.	
Ninth Program	Environmental Science	New Jersey Institute of Technology	College of Science and Liberal Arts	Chemistry and Environmental Science	USA	MSCHE	M.Sc.	
Tenth Program	Environmental Science	University of Manitoba	Clayton H. Riddell Faculty of Environment, Earth, and Resources	Environment and Geography	Canada	Eco Canada	M.Sc.	

The Websites (URLs) of the Similar Reference Programs

University	Website
University of York	https://www.york.ac.uk/study/postgraduate-taught/courses/msc-environmental-science-management/
The University of Sydney	https://www.sydney.edu.au/courses/uos-landing.html/content/courses/courses/pc/master-of-environmental-science.html?year=All&page=1
Qatar University	http://www.qu.edu.qa/artssciences/departments/bioenv/programs/MSc-EnvScience
Bangalore University	*https://eng.bangaloreuniversity.ac.in/science/environmental-science/*
Alexandria University	*https://igsr.alexu.edu.eg/index.php/ar/departments/environmental-studies*
University of Jordan	http://science.ju.edu.jo/ar/Arabic/StudyPlans/Forms/AllItems.aspx
Arabian Gulf University	https://www.agu.edu.bh/en/Academics/CGS/programs/Pages/Master-of-Sciences-in-Environmental-Sciences-and-Natural-Resources.aspx
The University of Southampton	https://www.southampton.ac.uk/courses/environmental-monitoring-and-assessment-masters-msc
New Jersey Institute of Technology	https://catalog.njit.edu/graduate/science-liberal-arts/chemistry-environmental-science/environmental-science-ms/



Summary of a Survey of Credit Hours and Courses in Reference Programs Similar to the Current Program

University	University of York	Qatar University	New Jersey Institute of Technology	Alexandria University	University of Jordan	Arabian Gulf University	Current Program (Sana'a University)
Country	United Kingdom	Qatar	USA	Egypt	Jordan	Bahrain	Republic of Yemen
College/Institute	==	Faculty of Arts and Sciences	College of Science and Liberal Arts	Institute of Graduate Studies and Research	Faculty of Sciences	College of Graduate Studies	Faculty of Petroleum and Natural Resources
Program title	Environmental Sciences	Environmental Sciences	Environmental Sciences	Environmental Studies	Environmental Sciences and Management	Environmental Sciences and Natural Resources	Environmental Studies
System of Study	Coursework and thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis
Number of Semesters (if any)	Full year (4 semesters)	Full year (4 semesters)	N/A	Two semesters	Two semesters	Two semesters	Two semesters
Total Credit Hours (Without Thesis)	100 C.H.	25 C.H.	30 C.H.	24 C.H.	33 C.H.	36 C.H.	36 C.H.
Number of Credit Hours for Compulsory Courses (if any)	50 C.H.	13 C.H.	15 C.H.	--	18 C.H.	--	30 C.H.
Number of Credit Hours for Elective Courses (if any)	50 C.H.	12 C.H.	9 C.H.	--	6 C.H.	--	--
Number of Compulsory Courses (if any)	4 Core Modules	5	5	--	6	--	12
Number of Elective Courses (if any)	8 Core Modules	4	3	--	2	--	--



Existence of Complementary Courses for program Admission and Their Number (Yes/No)	No	No	No	No	No	No	No
Number of Credit Hours for the Thesis	80 C.H.	9 C.H.	6 C.H.	--	9 C.H.	8 C.H.	6 C.H.
Specified Duration for Thesis Completion	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Minimum Duration for Program Completion	N/A	24 months	N/A	N/A	N/A	N/A	2 years
Maximum Duration for Program Completion	N/A	36 months Full time 60 months Part time	N/A	N/A	N/A	N/A	N/A

Annex (3) A Survey of Learning Outcomes for Similar Reference Programs and Their Alignment with Current Program Outcomes

Current Program			Similar Reference Programs					
			First Program	Second Program	Third Program	Fourth Program	Fifth Program	Sixth Program
Course Title	Environmental Sciences		Environmental Monitoring and Assessment	Environmental Sciences and Natural Resources	Environmental Sciences	Environmental Sciences	Environmental Sciences	Environmental Sciences
Faculty/Center /Institute	Faculty of Petroleum and Natural Resources		Department of Geography and Environmental Sciences	College of Graduate Studies	Faculty of Liberal Arts and Sciences	Faculty of Arts and Sciences	Department of Environmental Studies	Clayton H. Riddell Faculty of Environment, Earth, and Resources
University	Sana'a University		Southampton University	Arabian Gulf University	New Jersey Institute of Technology	Qatar University	University of New England	University of Manitoba
Country	Republic of Yemen		United Kingdom	Bahrain	USA	Qatar	United Kingdom	Canada
Program Intended Learning Outcomes (PILOs)	Upon successful completion of the program, the graduates shall be able to:							
Knowledge and Understanding	A1.	Demonstrate a sound knowledge and understanding of the principles and concepts of environmental sciences and related disciplines.	√		√	√	√	√
	A2.	Accurately identify the laboratory and field tests required to conduct environmental studies.	√	√	√	√	√	
	A3.	Explain environmental problems and issues at both national and global levels, proposing appropriate solutions.	√	√	√	√	√	√
Intellectual Skills	B1.	Explain the natural processes that shape the natural world and the impact of human activities on these processes.	√		√	√	√	√



	B2.	Propose the best effective solutions for addressing environmental problems.	√	√	√	√	√	√
	B3.	Plan effectively for the sustainable utilization of natural resources.	√	√	√	√	√	√
Professional and Practical Skills	C1.	Collect, analyze, and utilize environmental data and information to write scientific and methodical reports.	√	√	√	√	√	√
	C2.	Select effective solutions to address various environmental issues and problems faced by society.	√		√	√	√	
	C3.	Efficiently manage environmental departments, projects, and natural resources.	√		√		√	√
	C4.	Design strategic and implementation plans for environmental science projects, adhering to methodological principles.	√	√	√	√	√	√
Transferable Skills	D1.	Communicate effectively with colleagues and surrounding community, expressing ideas clearly and objectively.	√	√	√	√	√	√
	D2.	Negotiate with decision-makers and other stakeholders about how to preserve and protect the environment.	√	√	√	√	√	√
	D3.	Review current environmental laws and policies and contribute to their amendment when necessary.	√		√	√	√	√
	D4.	Work positively within a team, leveraging information and communication technology and other resources to self-develop professionally and academically.	√					√

PILOs of Similar Programs

PILOs of the First Reference Program:

First Reference Program	M.Sc. in Environmental Monitoring and Assessment
College & University	Department of Geography and Environmental Sciences – University of Southampton
Country	United Kingdom
URL	https://www.southampton.ac.uk/courses/environmental-monitoring-and-assessment-masters-msc
Program Intended Learning Outcomes (PILOs)	
Code or Number	
A1.	Full appreciation of the need for multi-disciplinary and interdisciplinary approaches to advancing knowledge and solving problems in environmental science and sustainability, drawing on the natural, physical and the social sciences
A2.	Deep understanding of the processes that shape the natural world at different temporal and spatial scales and their influence on and by human activities
A3.	Strong familiarity with the terminology, nomenclature and classification systems used in environmental science
A4.	Comprehensive understanding of appropriate methods for acquiring, interpreting and analyzing environmental and social science information
A5.	Deep understanding of the issues concerning the availability and sustainable use of the earth's resources
A6.	Deep knowledge of the contribution environmental science and sustainability make to debate on environmental issues and how knowledge of these forms the basis for informed concern about the earth and its people
A7.	Comprehensive understanding of the contribution of environmental science and sustainability to knowledge
A8.	Familiarity with environmental science and sustainability in the workplace and career paths open to environmental consultants and researchers.
B1.	Recognize, use and formulate subject-specific theories, paradigms, concepts and principles
B2.	Analyze, synthesize and summarize information critically to a high standard, e.g. suitable for publication
B3.	Collect and integrate multiple lines of evidence to formulate, test and then generate new hypotheses
B4.	Apply knowledge and understanding to complex real-world problems in unfamiliar contexts and within limited time-frames
B5.	Carry out assessments of the moral and ethical issues affecting investigations and appreciate the need for professional codes of conduct
C1.	Handle and integrate multiple information sources across multiple platforms, including working with databases in the broadest sense
C2.	Communicate appropriately to a variety of audiences in written, verbal and graphical forms to a standard suitable for publication or public consumption
C3.	Appreciate issues of sample selection, accuracy, precision and uncertainty during collection, recording and analysis of data in the field and laboratory, and how to overcome

C4.	Prepare, process, interpret and present data, using appropriate qualitative and quantitative techniques and packages (including geographic information systems) to a level suitable for publication
C5.	Solve numerical problems using computer and non-computer-based techniques to a standard comparable to that found in published research articles
C6.	Use the internet rapidly, critically and effectively as a means of communication and a source of information
C7.	Identify individual and collective goals and responsibilities and performing in a manner appropriate to these roles
C8.	Recognise and respect the views and opinions of other team members, and dealing effectively with disputes that may arise
C9.	Evaluate your own performance as an individual and a team member, and that of others within your team
C10.	Develop the advanced skills needed for self-managed learning (e.g. handling multiple conflicting deadlines; responding rapidly and effectively to change; acquiring self-management and organization skills)
C11.	Identify and work towards targets for personal, academic and career development (e.g. gaining memberships of professional bodies, doing work placements
C12.	Develop an adaptable and flexible approach to study and work, especially to meet targets and deadlines, especially to meet targets and deadlines.
D1.	Plan, conduct, and report on environmental and sustainability investigations at the level of competence expected of a consultant or junior researcher
D2.	Collect, record and analyze data to an advanced level using up to date techniques in the field, laboratory and statistical analysis
D3.	Carry out risk and ethics assessments to a high standard before undertaking field and laboratory investigations, and being aware of relevant health and safety regulations, and potential impact of investigations on the environment and people
D4.	Reference work to a very high standard as expected in a manuscript sent for publication

PILOs of the Second Reference Program:

Second Reference Program	**M.Sc. in Environmental Sciences and Natural Resources**
College & University	**College of Graduate Studies, Arabian Gulf University**
Country	**Bahrain**
URL	https://www.agu.edu.bh/en/Academics/CGS/programs/Pages/Master-of-Sciences-in-Environmental-Sciences-and-Natural-Resources.aspx
	Program Intended Learning Outcomes (PILOs)
Code or Number	
1.	Monitor ecological and environmental changes in various environments.
2.	Analyze the human-environment linkages and the fundamental drivers underlying ecological and environmental transformations.
3.	Conduct integrated analyses of ecological and environmental changes in various ecosystems.

4.	Use acquired competencies, integrate and evaluate information to manage natural and urban environments.
5.	Acquire theoretical and empirical skills in designing and conducting a scientific inquiry.
6.	
7.	

PILOs of the Third Reference Program:

Third Reference Program:	M.Sc. Environmental Science
College & University:	College of Science and Liberal Arts – New Jersey Institute of Technology
Country:	USA
URL	https://catalog.njit.edu/graduate/science-liberal-arts/chemistry-environmental-science/environmental-science-ms/
Program Intended Learning Outcomes (PILOs)	
Code or Number	
1	Ability to learn about natural processes and environmental pollutants.
2	Ability to learn about environmental regulations and laws.
3	Ability to develop an understanding of global environmental issues including, energy utilization and its connection to the environment.
4	An ability to problem-solve both as an individual and as part of a team.
5	An ability to identify and utilize evidence-based resources and information.
6	An ability to think critically and creatively about the environmental issues.
7	Ability in scientific research and writing using laboratory experiments related to environmental pollution issues and hazardous waste issues.
8	Students should understand issues related to toxicity.
9	Understanding of how scientific information obtained through the laboratory and computational data are used in research, and to maintain the environmental health of our society in terms of contamination in air, water, and soil.
10	Ability to analyze effectively and accurately and use technical skills and equipment to quantify environmental phenomena, use quantitative methods to describe these issues.
11	

PILOs of the Fourth Reference Program:

Fourth Reference Program	Environmental Sciences
College & University:	Faculty of Arts and Sciences, Qatar University
Country:	Qatar
URL	http://www.qu.edu.qa/artssciences/departments/bioenv/programs/BSc-EnvScience
Program Intended Learning Outcomes (PILOs)	
Code or Number	

1	PLO1. Define and explain basic principles and concepts in different environments and ecosystems.
2	PLO2. Explain the underlying causes for environmental degradation and conservation.
3	PLO3. Conduct experiments using modern laboratory techniques and analyze, evaluate and interpret data.
4	PLO4. Employ scientific approaches in interdisciplinary research in a safe and ethical manner, and to be aware of risk assessment, health and safety regulations as well as environmental laws
5	PLO5. Explain the human dimensions in their profession, including diverse social, cultural, economic, and international aspects.
6	PLO6. Apply skilled delivery using verbal and written communication to convey environmental issues.
7	PLO7. Explain contemporary and emerging environmental issues.
8	PLO8. Use techniques, skills and modern environmental tools in integration with applying professional and ethical practice with multidisciplinary team in professional practice.

PILOs of the Fifth Reference Program:

Fifth Reference Program:	Environmental Science
College & University:	Department of Environmental Studies – University of New England
Country:	UK
URL	https://www.une.edu.au/study/courses/master-of-environmental-science-researc
Program Intended Learning Outcomes (PILOs)	
Code or Number	
1	Exhibit a mastery of a scientific field of knowledge by: (a) having systematically acquired intellectual skill and experience that is grounded in contemporary developments in a scientific field related to natural resource management; (b) creating and communicating scholarship of a quality to satisfy peer review, extending the frontier of the field of knowledge and potentially meriting publication; (c) demonstrating knowledge of research principles and methods applicable in advanced academic inquiry.
2	Conduct research independently and systematically by: (a) conceptualizing, designing and implementing a project which will increase knowledge that is applicable or contributes new insights to a scientific field related to natural resources; (b) evaluating ideas and making informed judgements on complex issues or challenges in the scientific field of specialization; (c) communicating ideas, methodologies and conclusions clearly and effectively to specialist and non-specialist audiences.
3	Be accountable for their own learning and professional training by: (a) demonstrating the capacity to undertake further learning and/or a further career in or around research at an advanced level, and contributing substantially to the development or dissemination of new techniques, ideas, or approaches; (b) displaying the qualities and attributes necessary to exercise personal responsibility and autonomous initiative in complex and unpredictable situations, whether in professional environments or in the public domain.

PILOs of the Sixth Reference Program:

Sixth Reference Program:	Environmental Science
College & University:	Clayton H. Riddell Faculty of Environment, Earth, and Resources – University of Manitoba
Country:	Canada
URL	https://umanitoba.ca/explore/programs-of-study/master-environment-menv
Program Intended Learning Outcomes (PILOs)	
Code or Number	
1	Fluent in the basic terminology of the discipline.
2	Able to comment on complex environmental issues.
3	Have an in-depth understanding of environmental problems and potential solutions.

4	Be proficient in conducting a waste audit and have demonstrated experience working towards solutions to environmental problems locally or globally.

Annex (4) A Survey and Alignment of Aims of Similar Reference Programs with the Current Program Aims

Current Program		Similar Reference Programs					
		First Program	Second Program	Third Program	Fourth Program	Fifth Program	Sixth Program
Course Title	Environmental Sciences	Environmental Monitoring and Assessment	Environmental Studies	Environmental Sciences	Environmental Sciences	Environmental Sciences and Natural Resources	Environmental Sciences
Faculty/Center/Institute:	Faculty of Petroleum and Natural Resources	Department of Geography and Environmental Sciences	Institute of Graduate Studies and Research	Faculty of Arts and Sciences	Department of Humanities and Sciences	College of Graduate Studies	Clayton H. Riddell Faculty of Environment, Earth, and Resources
University:	Sana'a University	Southampton University	Alexandria University	Qatar University	YMCA University of Science & Technology	Arabian Gulf University	University of Manitoba
Country:	Republic of Yemen	United Kingdom	Egypt	Qatar	Indian	Bahrain	Canada
Current Program Aims:							
1. Enhance students' understanding and awareness of environmental issues and natural resources.		√	√	√	√	√	√
2. Strengthen students' capacity to preserve and protect the environment within the framework of sustainable development.		√	√	√	√	√	√
3. Equip students to conduct scientific research in environmental sciences, efficiently and methodically, at both the master's and doctoral levels.				√	√	√	
4. Contribute to the development of a cadre capable of managing development projects and assessing their environmental impacts in a manner that preserves surrounding ecosystems.		√	√		√	√	

Aims of Similar Programs:

Aims of the First Reference Similar Program:

First Reference Program	**Environmental Monitoring and Assessment**
Faculty/Center/Institute	**Geography and Environmental Science**
University	**Southampton University**
Country	**UK**
URL	https://www.southampton.ac.uk/courses/environmental-monitoring-and-assessment-masters-msc

No.	Program Aims
1	Understanding the importance of environmental concepts, terms, principles and methods.
2	Understanding the value of using techniques and ideas in different subject disciplines.
3	Understanding the socio-economic context of environmental issues and the legal framework for environmental regulation.
4	Understanding the contribution of science, engineering or communication to the identification and resolution of environmental issues
5	Understanding the human causes and consequences of environmental impacts.
6	Understanding general environmental concerns, including biodiversity, environmental limits to economic or population growth

Aims of the Second Reference Similar Program

Second Reference Program	**Environmental Studies**
Faculty/Center/Institute	**Institute of Graduate Studies and Research**
University	**Alexandria University**
Country:	**Egypt**
URL	*https://igsr.alexu.edu.eg/index.php/ar/departments/environmental-studies*

No.	Program Aims
1	Provides a diverse comprehensive background of knowledge, understanding and skills with a multidisciplinary context in the field of environmental studies and related disciplines.
2	Enhances research necessary to develop approaches that help preserve, conserve, protect or enhance the environment for future generations.
3	Applies a cross disciplinary approach to investigate and find potential solutions to environmental challenges in industries, cities, nature and relevant contexts.

Aims of the Third Reference Similar Program:

Third Reference Program	**Environmental Sciences**

Faculty/Center/Institute	**Faculty of Arts and Sciences, Qatar University**
University	**Qatar**
Country	http://www.qu.edu.qa/artssciences/departments/bioenv/programs/BSc-EnvScience
URL	**Environmental Sciences**

No.	Program Aims
1	This M.Sc. program addresses the need for a workforce that can solve a broad range of burgeoning environmental issues.
2	It prepares students for research in environmental science, for doctoral study for technical positions in universities, industry or governmental agencies.

Aims of the Fourth Reference Similar Program:

Fourth Reference Program	**Environmental Science**
Faculty/Center/Institute	**Department of Humanities and Sciences**
University	**UMCA University of Science & Technology**
Country	**India**
URL	https://jcboseust.ac.in/evs/assets/uploads/syllabus/M_Sc_syllabus_2017-2018_scheme1.pdf

No.	Program Aims
1	To create and disseminate knowledge to the students about environmental problems at local, regional and global scale.
2	To sensitize students towards environmental concerns and issues, and make them able to apply their knowledge for sustainable development.
3	To provide intensive practical training on modern instrumentation and analytical techniques for environmental analyses.
4	To orient the students towards efficient environmental decision-making and management.
5	To develop understanding about the impacts of climate change and related mitigation strategies.
6	To prepare students for successful career in education, research, industries, consultancy, regulatory agencies, boards and departments, etc.

Aims of the Fifth Reference Similar Program:

First Reference Program	**Environmental Sciences and Natural Resources**
Faculty/Center/Institute	**College of Graduate Studies, Arabian Gulf University**

University	**Bahrain**
Country	https://www.agu.edu.bh/en/Academics/CGS/programs/Pages/Master-of-Sciences-in-Environmental-Sciences-and-Natural-Resources.aspx
URL	**M.Sc. in Environmental Sciences and Natural Resources**

No.	Program Aims
1	Provide students with the required knowledge and skills in the field of environmental sciences and natural resources management.
2	Conduct research in applied environmental sciences.
3	Acquaint students with projects and research opportunities

Aims of the Sixth Reference Similar Program:

First Reference Program	**Environmental Science**
Faculty/Center/Institute	**Clayton H. Riddell Faculty of Environment, Earth, and Resources – University of Manitoba**
University	**Canada**
Country	https://umanitoba.ca/explore/programs-of-study/master-environment-menv
URL	**Environmental Science**

No.	Program Aims
1	To develop a scientific understanding of the environment, negative and positive feedbacks of natural and anthropogenic processes on the environment.
2	Faculty and students study environmental concerns from a variety of perspectives, from both the natural/physical sciences and the social sciences and humanities.

Annex (5) A Survey of Credit Hours of Similar Reference Programs

Required Data	Similar Reference Programs						Current Program
	First Program	Second Program	Third Program	Fourth Program	Fifth Program	Sixth Program	
Program Title:	Master of Science in Environmental Science	Master of Science in Environmental Science	Master of Science in Environmental Science	Master of Science in Environmental Studies	Master of Science in Environmental Sciences and Management	Master of Science in Environmental Sciences and Natural Resources	Master of Science (M.Sc.) in Environmental Sciences
Faculty/Center/Institute	==	Faculty of Arts and Sciences	College of Science and Liberal Arts	Institute of Graduate Studies and Research	Faculty of Sciences	College of Graduate Studies	Faculty of Petroleum and Natural Resources
University	University of York	Qatar University	New Jersey Institute of Technology	Alexandria University	University of Jordan	Arabian Gulf University	Sana'a University
Country	United Kingdom	Qatar	USA	Egypt	Jordan	Bahrain	Republic of Yemen
System of Study	Coursework and thesis	Coursework and thesis	Coursework and thesis	Course work and thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis
Study Mode	(Full-time) Regular	(Full-time) Regular	(Full-time) Regular	(Full-time) Regular	(Full-time) Regular	(Full-time) Regular	(Full-time) Regular
Number of Semesters (if any)	Full year (4 semesters)	Full year (4 semesters)	N/A	Two semesters	Two semesters	Two semesters	Two semesters
Total Credit Hours (Without Thesis)	100 C.H.	25 C.H.	30 C.H.	30 C.H.	33 C.H.	36 C.H.	30 C.H.
Total Credit Hours for Compulsory Courses	50 C.H.	13 C.H.	15 C.H.	26 C.H.	18 C.H.	--	30 C.H.
Total Credit Hours for Elective Courses	50 C.H.	12 C.H.	9 C.H.	4 C.H.	6 C.H.	--	--
Number of Compulsory Courses	4 Core Modules	5	5	--	6	--	12
Number of Elective Courses	8 Core Modules	4	3	--	2	--	--
Existence of additional prerequisite courses for program admission and their number	--	--	--	--	--	--	--

Total Credit Hours for Courses	100 C.H.	25 C.H.	30 C.H.	30 C.H.	33 C.H.	36 C.H.	30 C.H.
Number of Credit Hours for the Thesis	80 C.H.	9 C.H.	6 C.H.	6 C.H.	9 C.H.	8 C.H.	6 C.H.
Number of Credit Hours (Coursework + Thesis)	180 C.H.	34 C.H.	36 C.H.	36 C.H.	42 C.H.	44 C.H.	36 C.H.
Specified duration for thesis completion	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Minimum Duration for Program Completion	N/A	24 months	N/A	N/A	N/A	N/A	2 years
Maximum Duration for Program Completion	N/A	36 months Full time 60 months Part time	N/A	N/A	N/A	N/A	N/A

The Websites (URLs) of the Similar Reference Programs

No.	Program	University	Website (URL)
1	Master of Science in Environmental Sciences	University of York	https://www.york.ac.uk/study/postgraduate-taught/courses/msc-environmental-science-management/
2	Master of Science in Environmental Sciences	Qatar University	http://www.qu.edu.qa/artssciences/departments/bioenv/programs/MSc-EnvScience
3	Master of Science in Environmental Sciences	New Jersey Institute of Technology	https://catalog.njit.edu/graduate/science-liberal-arts/chemistry-environmental-science/environmental-science-ms/
4	Master of Science in Environmental Science	Alexandria University	*https://igsr.alexu.edu.eg/index.php/ar/departments/environmental-studies*
5	Master of Science in Environmental Sciences	University of Jordan	http://science.ju.edu.jo/ar/Arabic/StudyPlans/Forms/AllItems.aspx
6	Master of Science in Environmental Sciences	Arabian Gulf University	https://www.agu.edu.bh/en/Academics/CGS/programs/Pages/Master-of-Sciences-in-Environmental-Sciences-and-Natural-Resources.aspx



Annex (6) A Survey of Course Titles in Similar Reference Programs

	Program	Current Program	First Program	Second Program	Third Program	Fourth Program	Fifth Program	Sixth Program
Course Title in the Current Program	Program	Master of Science in Environmental Sciences	Master of Science in Environmental Sciences	Master of Science in Environmental Sciences	Master of Science in Environmental Sciences	Master of Science in Environmental Studies	Master of Science in Environmental Sciences and Management	Master of Science in Environmental Sciences and Natural Resources
	Faculty/Center/Institute	Faculty of Petroleum and Natural Resources	==	Faculty of Arts and Sciences	College of Science and Liberal Arts	Institute of Graduate Studies and Research	Faculty of Sciences	College of Graduate Studies
	University	Sana'a University	University of York	Qatar University	New Jersey Institute of Technology	Alexandria University	University of Jordan	Arabian Gulf University
	Country	Yemen	United Kingdom	Qatar	USA	Egypt	Jordan	Bahrain
	System of Study (Coursework and Thesis/ Only Coursework/Only Thesis)	Coursework and Thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis
	Specified Duration for Coursework Completion	Two semesters	Full year (4 semesters)	Full year (4 semesters)	N/A	Two semesters	Two semesters	Two semesters
	Total Credit Hours for the Courses	30 C.H.	100 C.H.	25 C.H.	30 C.H.	24 C.H.	33 C.H.	36 C.H.
1.	Fundamentals of Environmental Sciences					Fundamentals of Applied Environmental Sciences		Environmental Sciences



Course Title in the Current Program	Program	Current Program	First Program	Second Program	Third Program	Fourth Program	Fifth Program	Sixth Program
	Program	Master of Science in Environmental Sciences	Master of Science in Environmental Sciences	Master of Science in Environmental Sciences	Master of Science in Environmental Sciences	Master of Science in Environmental Studies	Master of Science in Environmental Sciences and Management	Master of Science in Environmental Sciences and Natural Resources
	Faculty/Center/Institute	Faculty of Petroleum and Natural Resources	==	Faculty of Arts and Sciences	College of Science and Liberal Arts	Institute of Graduate Studies and Research	Faculty of Sciences	College of Graduate Studies
	University	Sana'a University	University of York	Qatar University	New Jersey Institute of Technology	Alexandria University	University of Jordan	Arabian Gulf University
	Country	Yemen	United Kingdom	Qatar	USA	Egypt	Jordan	Bahrain
	System of Study (Coursework and Thesis/ Only Coursework/Only Thesis)	Coursework and Thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis
	Specified Duration for Coursework Completion	Two semesters	Full year (4 semesters)	Full year (4 semesters)	N/A	Two semesters	Two semesters	Two semesters
	Total Credit Hours for the Courses	30 C.H.	100 C.H.	25 C.H.	30 C.H.	24 C.H.	33 C.H.	36 C.H.
2.	Environmental Biology			Ecosystems	Invasion Ecology	Environmental Biology and Chemistry	Ecosystems	

Course Title in the Current Program	Program	Current Program	First Program	Second Program	Third Program	Fourth Program	Fifth Program	Sixth Program
	Program	Master of Science in Environmental Sciences	Master of Science in Environmental Sciences	Master of Science in Environmental Sciences	Master of Science in Environmental Sciences	Master of Science in Environmental Studies	Master of Science in Environmental Sciences and Management	Master of Science in Environmental Sciences and Natural Resources
	Faculty/Center/Institute	Faculty of Petroleum and Natural Resources	==	Faculty of Arts and Sciences	College of Science and Liberal Arts	Institute of Graduate Studies and Research	Faculty of Sciences	College of Graduate Studies
	University	Sana'a University	University of York	Qatar University	New Jersey Institute of Technology	Alexandria University	University of Jordan	Arabian Gulf University
	Country	Yemen	United Kingdom	Qatar	USA	Egypt	Jordan	Bahrain
	System of Study (Coursework and Thesis/ Only Coursework/Only Thesis)	Coursework and Thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis
	Specified Duration for Coursework Completion	Two semesters	Full year (4 semesters)	Full year (4 semesters)	N/A	Two semesters	Two semesters	Two semesters
	Total Credit Hours for the Courses	30 C.H.	100 C.H.	25 C.H.	30 C.H.	24 C.H.	33 C.H.	36 C.H.
3.	Advanced Environmental Chemistry			Environmental Chemistry	Environmental Chemistry	Environmental Biology and Chemistry	Advanced Environmental Chemistry	



Course Title in the Current Program	Program	Current Program	First Program	Second Program	Third Program	Fourth Program	Fifth Program	Sixth Program
	Program	Master of Science in Environmental Sciences	Master of Science in Environmental Sciences	Master of Science in Environmental Sciences	Master of Science in Environmental Sciences	Master of Science in Environmental Studies	Master of Science in Environmental Sciences and Management	Master of Science in Environmental Sciences and Natural Resources
	Faculty/Center/Institute	Faculty of Petroleum and Natural Resources	==	Faculty of Arts and Sciences	College of Science and Liberal Arts	Institute of Graduate Studies and Research	Faculty of Sciences	College of Graduate Studies
	University	Sana'a University	University of York	Qatar University	New Jersey Institute of Technology	Alexandria University	University of Jordan	Arabian Gulf University
	Country	Yemen	United Kingdom	Qatar	USA	Egypt	Jordan	Bahrain
	System of Study (Coursework and Thesis/ Only Coursework/Only Thesis)	Coursework and Thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis
	Specified Duration for Coursework Completion	Two semesters	Full year (4 semesters)	Full year (4 semesters)	N/A	Two semesters	Two semesters	Two semesters
	Total Credit Hours for the Courses	30 C.H.	100 C.H.	25 C.H.	30 C.H.	24 C.H.	33 C.H.	36 C.H.
4.	Environmental Geology					Geological and Geochemical Studies		Environmental Geology



Course Title in the Current Program	Program	Current Program	First Program	Second Program	Third Program	Fourth Program	Fifth Program	Sixth Program
	Program	Master of Science in Environmental Sciences	Master of Science in Environmental Sciences	Master of Science in Environmental Sciences	Master of Science in Environmental Sciences	Master of Science in Environmental Studies	Master of Science in Environmental Sciences and Management	Master of Science in Environmental Sciences and Natural Resources
	Faculty/Center/Institute	Faculty of Petroleum and Natural Resources	==	Faculty of Arts and Sciences	College of Science and Liberal Arts	Institute of Graduate Studies and Research	Faculty of Sciences	College of Graduate Studies
	University	Sana'a University	University of York	Qatar University	New Jersey Institute of Technology	Alexandria University	University of Jordan	Arabian Gulf University
	Country	Yemen	United Kingdom	Qatar	USA	Egypt	Jordan	Bahrain
	System of Study (Coursework and Thesis/ Only Coursework/Only Thesis)	Coursework and Thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis
	Specified Duration for Coursework Completion	Two semesters	Full year (4 semesters)	Full year (4 semesters)	N/A	Two semesters	Two semesters	Two semesters
	Total Credit Hours for the Courses	30 C.H.	100 C.H.	25 C.H.	30 C.H.	24 C.H.	33 C.H.	36 C.H.
5.	Renewable and Non-Renewable Energy and Climate Change		Climate Change Science	Renewable Energy Sources and Climate Change		Biomass and Energy		Climatology and Climate Change

Course Title in the Current Program	Program	Current Program	First Program	Second Program	Third Program	Fourth Program	Fifth Program	Sixth Program
	Program	Master of Science in Environmental Sciences	Master of Science in Environmental Sciences	Master of Science in Environmental Sciences	Master of Science in Environmental Sciences	Master of Science in Environmental Studies	Master of Science in Environmental Sciences and Management	Master of Science in Environmental Sciences and Natural Resources
	Faculty/Center/Institute	Faculty of Petroleum and Natural Resources	==	Faculty of Arts and Sciences	College of Science and Liberal Arts	Institute of Graduate Studies and Research	Faculty of Sciences	College of Graduate Studies
	University	Sana'a University	University of York	Qatar University	New Jersey Institute of Technology	Alexandria University	University of Jordan	Arabian Gulf University
	Country	Yemen	United Kingdom	Qatar	USA	Egypt	Jordan	Bahrain
	System of Study (Coursework and Thesis/ Only Coursework/Only Thesis)	Coursework and Thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis
	Specified Duration for Coursework Completion	Two semesters	Full year (4 semesters)	Full year (4 semesters)	N/A	Two semesters	Two semesters	Two semesters
	Total Credit Hours for the Courses	30 C.H.	100 C.H.	25 C.H.	30 C.H.	24 C.H.	33 C.H.	36 C.H.
6.	Biostatistics		Research Skills and Statistical Methods	Experimental Design and Statistical Analysis		Applied Statistics	Biostatistics	Applied Statistics

Course Title in the Current Program	Program	Current Program	First Program	Second Program	Third Program	Fourth Program	Fifth Program	Sixth Program
	Program	Master of Science in Environmental Sciences	Master of Science in Environmental Sciences	Master of Science in Environmental Sciences	Master of Science in Environmental Sciences	Master of Science in Environmental Studies	Master of Science in Environmental Sciences and Management	Master of Science in Environmental Sciences and Natural Resources
	Faculty/Center/Institute	Faculty of Petroleum and Natural Resources	==	Faculty of Arts and Sciences	College of Science and Liberal Arts	Institute of Graduate Studies and Research	Faculty of Sciences	College of Graduate Studies
	University	Sana'a University	University of York	Qatar University	New Jersey Institute of Technology	Alexandria University	University of Jordan	Arabian Gulf University
	Country	Yemen	United Kingdom	Qatar	USA	Egypt	Jordan	Bahrain
	System of Study (Coursework and Thesis/ Only Coursework/Only Thesis)	Coursework and Thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis
	Specified Duration for Coursework Completion	Two semesters	Full year (4 semesters)	Full year (4 semesters)	N/A	Two semesters	Two semesters	Two semesters
	Total Credit Hours for the Courses	30 C.H.	100 C.H.	25 C.H.	30 C.H.	24 C.H.	33 C.H.	36 C.H.
7.	Environmental Pollution		Environmental Toxicology	Toxicology and Environmental Pollution	Toxicology	Effects of Pollution on Plants and Animals	Air Pollution	Environmental Pollution



Course Title in the Current Program	Program	Current Program	First Program	Second Program	Third Program	Fourth Program	Fifth Program	Sixth Program
	Program	Master of Science in Environmental Sciences	Master of Science in Environmental Sciences	Master of Science in Environmental Sciences	Master of Science in Environmental Sciences	Master of Science in Environmental Studies	Master of Science in Environmental Sciences and Management	Master of Science in Environmental Sciences and Natural Resources
	Faculty/Center/Institute	Faculty of Petroleum and Natural Resources	==	Faculty of Arts and Sciences	College of Science and Liberal Arts	Institute of Graduate Studies and Research	Faculty of Sciences	College of Graduate Studies
	University	Sana'a University	University of York	Qatar University	New Jersey Institute of Technology	Alexandria University	University of Jordan	Arabian Gulf University
	Country	Yemen	United Kingdom	Qatar	USA	Egypt	Jordan	Bahrain
	System of Study (Coursework and Thesis/ Only Coursework/Only Thesis)	Coursework and Thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis
	Specified Duration for Coursework Completion	Two semesters	Full year (4 semesters)	Full year (4 semesters)	N/A	Two semesters	Two semesters	Two semesters
	Total Credit Hours for the Courses	30 C.H.	100 C.H.	25 C.H.	30 C.H.	24 C.H.	33 C.H.	36 C.H.
8.	Biodiversity		Biodiversity Conservation and Protected Areas	Environmental and Biodiversity Conservation in Qatar	Biodiversity Index			Biodiversity Conservation

Course Title in the Current Program	Program	Current Program	First Program	Second Program	Third Program	Fourth Program	Fifth Program	Sixth Program
	Program	Master of Science in Environmental Sciences	Master of Science in Environmental Sciences	Master of Science in Environmental Sciences	Master of Science in Environmental Sciences	Master of Science in Environmental Studies	Master of Science in Environmental Sciences and Management	Master of Science in Environmental Sciences and Natural Resources
	Faculty/Center/Institute	Faculty of Petroleum and Natural Resources	==	Faculty of Arts and Sciences	College of Science and Liberal Arts	Institute of Graduate Studies and Research	Faculty of Sciences	College of Graduate Studies
	University	Sana'a University	University of York	Qatar University	New Jersey Institute of Technology	Alexandria University	University of Jordan	Arabian Gulf University
	Country	Yemen	United Kingdom	Qatar	USA	Egypt	Jordan	Bahrain
	System of Study (Coursework and Thesis/ Only Coursework/Only Thesis)	Coursework and Thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis
	Specified Duration for Coursework Completion	Two semesters	Full year (4 semesters)	Full year (4 semesters)	N/A	Two semesters	Two semesters	Two semesters
	Total Credit Hours for the Courses	30 C.H.	100 C.H.	25 C.H.	30 C.H.	24 C.H.	33 C.H.	36 C.H.
9.	Sustainable Development and EIA		Environmental Impact Assessment		Sustainability of Resources	Environmental Impact Assessment and	Environmental Impact Assessment	Environmental Impact Assessment



Course Title in the Current Program	Program	Current Program	First Program	Second Program	Third Program	Fourth Program	Fifth Program	Sixth Program
	Program	Master of Science in Environmental Sciences	Master of Science in Environmental Sciences	Master of Science in Environmental Sciences	Master of Science in Environmental Sciences	Master of Science in Environmental Studies	Master of Science in Environmental Sciences and Management	Master of Science in Environmental Sciences and Natural Resources
	Faculty/Center/Institute	Faculty of Petroleum and Natural Resources	==	Faculty of Arts and Sciences	College of Science and Liberal Arts	Institute of Graduate Studies and Research	Faculty of Sciences	College of Graduate Studies
	University	Sana'a University	University of York	Qatar University	New Jersey Institute of Technology	Alexandria University	University of Jordan	Arabian Gulf University
	Country	Yemen	United Kingdom	Qatar	USA	Egypt	Jordan	Bahrain
	System of Study (Coursework and Thesis/ Only Coursework/Only Thesis)	Coursework and Thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis
	Specified Duration for Coursework Completion	Two semesters	Full year (4 semesters)	Full year (4 semesters)	N/A	Two semesters	Two semesters	Two semesters
	Total Credit Hours for the Courses	30 C.H.	100 C.H.	25 C.H.	30 C.H.	24 C.H.	33 C.H.	36 C.H.
						Environmental Review		
10.	Waste Monitoring and Management		Pollutant Monitoring,	Solid Waste Management	Introduction to Solid and Hazardous	Biological Waste Treatment	Solid Waste Management	



Course Title in the Current Program	Program	Current Program	First Program	Second Program	Third Program	Fourth Program	Fifth Program	Sixth Program
	Program	Master of Science in Environmental Sciences	Master of Science in Environmental Sciences	Master of Science in Environmental Sciences	Master of Science in Environmental Sciences	Master of Science in Environmental Studies	Master of Science in Environmental Sciences and Management	Master of Science in Environmental Sciences and Natural Resources
	Faculty/Center/Institute	Faculty of Petroleum and Natural Resources	==	Faculty of Arts and Sciences	College of Science and Liberal Arts	Institute of Graduate Studies and Research	Faculty of Sciences	College of Graduate Studies
	University	Sana'a University	University of York	Qatar University	New Jersey Institute of Technology	Alexandria University	University of Jordan	Arabian Gulf University
	Country	Yemen	United Kingdom	Qatar	USA	Egypt	Jordan	Bahrain
	System of Study (Coursework and Thesis/ Only Coursework/Only Thesis)	Coursework and Thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis
	Specified Duration for Coursework Completion	Two semesters	Full year (4 semesters)	Full year (4 semesters)	N/A	Two semesters	Two semesters	Two semesters
	Total Credit Hours for the Courses	30 C.H.	100 C.H.	25 C.H.	30 C.H.	24 C.H.	33 C.H.	36 C.H.
			Evaluation, and Control		Waste Management			
11.	Remote Sensing and GIS		Spatial Analysis	GIS and Databases	GIS + Remote Sensing Techniques			



Course Title in the Current Program	Program	Current Program	First Program	Second Program	Third Program	Fourth Program	Fifth Program	Sixth Program
	Program	Master of Science in Environmental Sciences	Master of Science in Environmental Sciences	Master of Science in Environmental Sciences	Master of Science in Environmental Sciences	Master of Science in Environmental Studies	Master of Science in Environmental Sciences and Management	Master of Science in Environmental Sciences and Natural Resources
	Faculty/Center/Institute	Faculty of Petroleum and Natural Resources	==	Faculty of Arts and Sciences	College of Science and Liberal Arts	Institute of Graduate Studies and Research	Faculty of Sciences	College of Graduate Studies
	University	Sana'a University	University of York	Qatar University	New Jersey Institute of Technology	Alexandria University	University of Jordan	Arabian Gulf University
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	System of Study (Coursework and Thesis/ Only Coursework/Only Thesis)	Coursework and Thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis
	Specified Duration for Coursework Completion	Two semesters	Full year (4 semesters)	Full year (4 semesters)	N/A	Two semesters	Two semesters	Two semesters
	Total Credit Hours for the Courses	30 C.H.	100 C.H.	25 C.H.	30 C.H.	24 C.H.	33 C.H.	36 C.H.
12.	Research Project and Seminar		Research Skills and Statistical Methods	Graduation Project in Environmental Sciences	Independent Study		Research Project	Seminar + Diploma Project
13.								

Course Title in the Current Program	Program	Current Program	First Program	Second Program	Third Program	Fourth Program	Fifth Program	Sixth Program
	Program	Master of Science in Environmental Sciences	Master of Science in Environmental Sciences	Master of Science in Environmental Sciences	Master of Science in Environmental Sciences	Master of Science in Environmental Studies	Master of Science in Environmental Sciences and Management	Master of Science in Environmental Sciences and Natural Resources
	Faculty/Center/Institute	Faculty of Petroleum and Natural Resources	==	Faculty of Arts and Sciences	College of Science and Liberal Arts	Institute of Graduate Studies and Research	Faculty of Sciences	College of Graduate Studies
	University	Sana'a University	University of York	Qatar University	New Jersey Institute of Technology	Alexandria University	University of Jordan	Arabian Gulf University
	Country	Yemen	United Kingdom	Qatar	USA	Egypt	Jordan	Bahrain
	System of Study (Coursework and Thesis/ Only Coursework/Only Thesis)	Coursework and Thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis
	Specified Duration for Coursework Completion	Two semesters	Full year (4 semesters)	Full year (4 semesters)	N/A	Two semesters	Two semesters	Two semesters
	Total Credit Hours for the Courses	30 C.H.	100 C.H.	25 C.H.	30 C.H.	24 C.H.	33 C.H.	36 C.H.
14.								
15.								
16.								

Course Title in the Current Program	Program	Current Program	First Program	Second Program	Third Program	Fourth Program	Fifth Program	Sixth Program
	Program	Master of Science in Environmental Sciences	Master of Science in Environmental Sciences	Master of Science in Environmental Sciences	Master of Science in Environmental Sciences	Master of Science in Environmental Studies	Master of Science in Environmental Sciences and Management	Master of Science in Environmental Sciences and Natural Resources
	Faculty/Center/Institute	Faculty of Petroleum and Natural Resources	==	Faculty of Arts and Sciences	College of Science and Liberal Arts	Institute of Graduate Studies and Research	Faculty of Sciences	College of Graduate Studies
	University	Sana'a University	University of York	Qatar University	New Jersey Institute of Technology	Alexandria University	University of Jordan	Arabian Gulf University
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	System of Study (Coursework and Thesis/ Only Coursework/Only Thesis)	Coursework and Thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis	Coursework and thesis
	Specified Duration for Coursework Completion	Two semesters	Full year (4 semesters)	Full year (4 semesters)	N/A	Two semesters	Two semesters	Two semesters
	Total Credit Hours for the Courses	30 C.H.	100 C.H.	25 C.H.	30 C.H.	24 C.H.	33 C.H.	36 C.H.
	Credit Hours for Thesis							

Summary of Course Titles for the Current Program after Surveying Similar Reference Programs

No.	Course Title after Survey		Theo.	Pra.	Tut./Semi	Total credit hours	Remarks
1.	Applied Environmental Science		2	0	0	2	
2.	Environmental Biology		3	0	0	3	
3.	Environmental Chemistry		3	0	0	3	
4.	Environmental Geology		3	0	0	3	
5.	Energy and Climate Change		2	0	0	2	
6.	Environmental Statistics		1	0	0	2	
7.	Environmental Pollution and Toxicology		3	0	0	3	
8.	Biodiversity		3	0	0	3	
9.	Sustainable Development and EIA		3	0	0	3	
10.	Solid Waste Management and Monitoring		2	0	0	2	
11.	Remote Sensing and GIS		2	0	0	2	
12.	Research Project and Seminar		1	0	1	2	
....	**Total**		**29**	**0**	**1**	**30**	**CH**

Annex (7) Alignment of Program Aims with the Program Intended Learning Outcomes (PILOs)

No.	Aim	PILOs Codes															
		A1.	A2	A3	B1	B2	B3	C1	C2	C3	C4	D1	D2	D3	D4			
1	Enhance students' understanding and awareness of environmental issues and natural resources.	√	√	√	√		√	√	√		√	√		√	√			
2	Strengthen students' capacity to preserve and protect the environment within the framework of sustainable development.		√	√	√	√	√	√	√	√	√		√	√	√			
3	Equip students to conduct scientific research in environmental sciences, efficiently and methodically, at both the master's and doctoral levels.	√	√	√	√	√	√	√		√	√			√				
4	Contribute to the development of a cadre capable of managing development projects and assessing their environmental impacts in a manner that preserves surrounding ecosystems.	√		√	√		√	√	√	√	√	√	√	√	√			
5																		

PILOs:

A1. Demonstrate a sound knowledge and understanding of the principles and concepts of environmental sciences and related disciplines.
A2. Accurately identify the laboratory and field tests required to conduct environmental studies.
A3. Explain environmental problems and issues at both national and global levels, proposing appropriate solutions.
B1. Explain the natural processes that shape the natural world and the impact of human activities on these processes.
B2. Propose the best effective solutions for addressing environmental problems.

B3. Plan effectively for the sustainable utilization of natural resources.
C1. Collect, analyze, and utilize environmental data and information to write scientific and methodical reports.
C2. Select effective solutions to address various environmental issues and problems faced by society.
C3. Efficiently manage environmental departments, projects, and natural resources.
C4. Design strategic and implementation plans for environmental science projects, adhering to methodological principles.
D1. Communicate effectively with colleagues and surrounding community, expressing ideas clearly and objectively.
D2. Negotiate with decision-makers and other stakeholders about how to preserve and protect the environment.
D3. Review current environmental laws and policies and contribute to their amendment when necessary.
D4. Work positively within a team, leveraging information and communication technology and other resources to self-develop professionally and academically.

Annex (8) Attributes of the Program Graduates and Career Opportunities.

First: Graduate Attributes:

Field	Competency Statement
Knowledge and Understanding	**The graduate of this program should be able to demonstrate knowledge and understanding of:**
	▪ Fundamentals of environmental sciences, including environmental chemistry, environmental geology, and environmental biology. ▪ The principles of sustainable development, biodiversity, and environmental conservation. ▪ Principles of environmental resource management, consumption optimization, and environmental pollution. ▪ Principles of statistics, remote sensing, and GIS. ▪ Fundamentals of environmental management and EIA. ▪ Principles of scientific writing and research methodology. ▪
B. Cognitive/ Intellectual Skills:	**The graduate of this program should be able to:**
	▪ Analyze data obtained from field research. ▪ Evaluate the environmental situation and possible alternatives for environmental conservation. ▪ Review and monitor the environmental status and its progress or degradation. ▪ Develop appropriate solutions and alternatives to address environmental problems. ▪ ▪ ▪
Practical and Professional Skills:	**The graduate of this program should be able to:**
	▪ Implement the appropriate and necessary procedures for environmental conservation. ▪ Conduct field surveys suitable for diverse ecosystems. ▪ Review and evaluate the environmental performance of various activities. ▪ Develop environmental programs that promote environmental conservation and sustainable development. ▪ Interpret data and write reports effectively. ▪
General Skills:	**The graduate of this program should be able to:**
	▪ Manage their own learning and development, as well as time management and organizational skills. ▪ Work effectively as a team member and manage and lead teams. ▪ Demonstrate respect, politeness, and appropriate empathy when interacting with stakeholders.

	▪ ▪

Second: Employment Opportunities for Graduates of the Program:

Graduates of the Environmental Sciences Department have a wide range of employment opportunities in numerous public and private institutions. Some of the most prominent examples include, but are not limited to:

- Ministry of Water and Environment
- General Authority for Environmental Protection
- General Corporations for Water and Sanitation in Governorates
- Environmental and conservation departments under local administration authorities in the governorates
- Ministry of Fish Wealth
- Ministry of Agriculture and Irrigation
- Maritime Affairs Authority
- General Ports Corporation
- Ministry of Planning and International Cooperation
- Social Fund for Development
- Ministry of Industry
- General Investment Authority
- Ministry of Oil and Minerals
- Geological Survey and Mineral Resources Authority
- Private sector, such as factories, oil companies, mining companies, etc.
- Local and international organizations working in the environmental field
- Environmental consulting firms
- Any other entities related to environmental issues

Annex (9) Alignment of PILOs with the National Academic Reference Standards (NARS) of the Arab Republic of Egypt (there are no Yemeni national standards)

A. Knowledge and Understanding

Upon completion of the environmental sciences program, students will have knowledge and understanding of:

No.	Program Intended Learning Outcomes (PILOs)	PILOs Codes																
		A1.	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3	D4	
A1	Basics of biology, chemistry, mathematics, earth sciences, physics and computer sciences.	✓		✓														
A2.	Principles of ecology, environmental geology, biodiversity, conservation, and natural resources management.	✓	✓	✓														
A3.	Environmental chemistry, pollution, environmental health and waste management.	✓	✓	✓														
A4.	Remote sensing, statistics, and GIS.	✓																
A5.	Environmental policies, impact assessment, environmental economics, environmental management and legislation, national and international regulations and law.	✓	✓	✓														
A6.	Sustainable development concepts as well as the tools and indicators of evaluating sustainability.	✓	✓															
A7.	Systems analysis and modeling of environmental systems.	✓																



A8.	Planning, implementation and reporting of fieldwork (data collection, sampling and working with portable apparatuses).		✓															
A9.	The relevant and recent laboratory methodology; the safe and proper operation of laboratory techniques and instruments.		✓	✓														
A10.	The methods of data management and analysis.		✓															
A11.	The most important contemporary environmental issues, treaties or conventions and/or organizations.		✓	✓														
A12.	The role analysis of national and international policies and regulations.			✓														

B. Cognitive and Intellectual Skills

No.	Program Intended Learning Outcomes (PILOs)	PILOs Codes																
		A1.	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3	D4	
B1.	Examine critically scientific evidence, both quantitative and qualitative, in order to arrive at evidence-based conclusions.					✓												
B2.	Understand not only the theoretical underpinnings of the discipline but also how that theory influences practice.						✓											
B3.	Assess alternatives which take account of qualifying, affording and constraining circumstances.					✓		✓										



B4.	Monitor and review the applications, progress and outcomes of suggested solutions.							✓										
B5.	Evaluate critically published information.							✓										
B6.	Analyze and identify criteria and specifications appropriate to specific problems at different levels, and propose options for their solution.					✓	✓	✓										
B7.	Carry out environmental impact assessments for a wide range of projects.					✓	✓	✓										

C. Practical and Professional Skills

No.	Program Intended Learning Outcomes (PILOs)	PILOs																
		A1.	A2.	A3.	A4.	B1.	B2.	B3.	B4.	C1.	C2.	C3.	C4.	D1.	D2.	D3.	D4.	
C1.	Apply the principles of environmental sciences to come with the best practices that will ensure a sustainable human development.									✓	✓	✓	✓					
C2.	Use acquired knowledge and understanding to participate in the implementation of the proper solutions and mitigation measures of environmental issues.									✓	✓	✓	✓					
C3.	Evaluate and monitor features of nature conservation interest in habitats and sites.									✓		✓						

C4.	Collect and interpret data from a variety of sources, and present it as written scientific reports and policy recommendations.									✓		✓	✓					
C5.	Conduct field surveys to establish baseline data or other levels.									✓			✓					
C6.	Conduct audits to evaluate the environmental performance of particular activities.									✓			✓					
C7.	Investigate reasons for deterioration of the water and air quality and suggesting changes or solutions to these problems.									✓	✓	✓	✓					
C8.	Develop environmental programmes that ensure corporate compliance with the environmental regulations and laws.											✓						
C9.	Develop pollution control, pollution prevention and recycling programs through cleaner production techniques.											✓						
C10.	Prepare and implement annual management plans based on ecological surveys and scientific observation.										✓	✓						

D. Transferable/Generic Skills

No.	Program Intended Learning Outcomes (PILOs)	PILOs Codes															
		A1.	A2.	A3.	A4.	B1.	B2.	B3.	B4.	C1.	C2.	C3.	C4.	D1.	D2.	D3.	D4.	
D1.	Present information and express ideas through structure and writing essays and oral modes using IT.													✓		✓	✓	



D2.	Manage one's own learning and development, including time management and organizational skills.												✓	✓			
D3.	Work in team and comprehend and assume the interchangeable role of leaders and followers.												✓	✓		✓	
D4.	Possess good project management and business skills												✓	✓	✓	✓	
D5.	Demonstrate respect, tact, empathy and appropriate verbal and nonverbal expression when dealing with colleagues, superiors and the general population.												✓	✓		✓	
D6.	Enhance sense of responsibility towards environmental sustainability to build positive interest or affection for environmental research and inquiry.												✓	✓	✓	✓	

Program Intended Learning Outcomes (PILOs):

A1. Demonstrate a sound knowledge and understanding of the principles and concepts of environmental sciences and related disciplines.
A2. Accurately identify the laboratory and field tests required to conduct environmental studies.
A3. Explain environmental problems and issues at both national and global levels, proposing appropriate solutions.
B1. Explain the natural processes that shape the natural world and the impact of human activities on these processes.
B2. Propose the best effective solutions for addressing environmental problems.
B3. Plan effectively for the sustainable utilization of natural resources.
C1. Collect, analyze, and utilize environmental data and information to write scientific and methodical reports.
C2. Select effective solutions to address various environmental issues and problems faced by society.

C3. Efficiently manage environmental departments, projects, and natural resources.
C4. Design strategic and implementation plans for environmental science projects, adhering to methodological principles.
D1. Communicate effectively with colleagues and surrounding community, expressing ideas clearly and objectively.
D2. Negotiate with decision-makers and other stakeholders about how to preserve and protect the environment.
D3. Review current environmental laws and policies and contribute to their amendment when necessary.
D4. Work positively within a team, leveraging information and communication technology and other resources to self-develop professionally and academically.

Annex (10) Alignment of PILOs with the Standards of the Middle States Commission on Higher Education (MSCHE)

Name of Accreditation Body: Middle State Commission on Higher Education Standards Issuance: ..... No.

No.	Standard Number and Text for the International Accreditation Body	PILOs Codes															
		A1.	A2.	A3.	B1.	B2.	B3.	C1.		C2.	C3.	C4.	D1.	D2.	D3.	D4.	
1	**Mission and Aims**	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	
2	Ethics and integrity						✓				✓	✓	✓		✓	✓	
3	Design and Delivery of the Student Learning Experience		✓		✓	✓		✓		✓		✓		✓			
4	Support of the Student Experience	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	
5	Educational Effectiveness Assessment																
6	Planning, Resources, and Institutional Improvement																
7	Governance, Leadership, and Administration																
8																	
9																	



10																	
11																	
12																	
13																	
14																	

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Annex (11) Coding of Program Courses and Their Alignment with PILOs (Curriculum Map Matrix)

No	Course Title	Cr. H	Course Code	Semester	PILOs Codes																Total number of PILOs
					A1	A 2	A 3	A 4	B 1	B 2	B 3	B 4	C 1	C 2	C 3	C4	D 1	D 2	D 3	D 4	
1.	Applied Environmental Science	2	MEN101.	S1.	1	0	1	0	1	0	0	0	0	1	1	1	1	0	0	1	8
2.	Environmental Biology	3	MEN102.	S1.	1	1	0	0	1	0	0	0	0	1	0	1	1	0	0	1	7
3.	Environmental Chemistry	3	MEN103.	S1.	1	1	1	0	1	0	0	0	0	1	0	1	1	0	0	1	8
4.	Environmental Geology	3	MEN104.	S1.	1	0	0	0	1	0	0	0	0	1	0	1	1	0	0	1	6
5.	Energy and Climate Change	2	MEN105.	S1.	1	0	1	0	1	1	1	0	0	1	0	0	1	1	0	1	9
6.	Environmental Statistics	2	MEN106.	S1.	1	1	0	0	0	0	0	0	1	1	0	1	1	1	0	1	8
7.	Environmental Pollution and Toxicology	3	MEN201.	S2.	1	1	1	0	1	1	0	0	1	1	1	1	1	1	1	1	13
8.	Biodiversity	3	MEN202.	S2.	1	1	1	0	1	1	1	0	1	1	1	1	1	1	1	1	14
9.	Sustainable Development and EIA	3	MEN203.	S2.	1	1	1	0	1	1	1	0	1	1	1	0	1	1	1	1	13
10.	Solid Waste Management and Monitoring	2	MEN204.	S2.	1	1	1	0	1	1	0	0	1	1	1	1	1	1	1	1	13
11.	Remote Sensing and GIS	2	MEN205.	S2.	1	1	0	0	1	1	0	0	0	1	0	1	1	1	0	1	9
12.	Research Project and Seminar	2	MEN206.	S2.	1	0	1	0	1	1	1	0	1	1	1	1	1	0	1	1	12
13.	//	///////	////////	/////	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///
14.																					

No	Course Title	Cr. H	Course Code	Semester	PILOs Codes																Total number of PILOs
					A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3	D4	
15.																					
	Master's Thesis	6																			
	Total number of courses contributing to the achievement of PILOs	36			112	8	8	0	11	7	4	0	6	12	6	110	12	7	5	12	0

1= The course contributes to achieving the PILOs.

PILOs:

A1. Demonstrate a sound knowledge and understanding of the principles and concepts of environmental sciences and related disciplines.
A2. Accurately identify the laboratory and field tests required to conduct environmental studies.
A3. Explain environmental problems and issues at both national and global levels, proposing appropriate solutions.
B1. Explain the natural processes that shape the natural world and the impact of human activities on these processes.
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D4. Work positively within a team, leveraging information and communication technology and other resources to self-develop professionally and academically.

Annex (12) Study Plan for the Master of Science Program

Program Title and Final Award:	M.Sc. in Environmental Sciences
Total Number of Credit Hours required for Program Completion	36 credit hours
Faculty/center/institute to which the program belongs:	Faculty of Petroleum and Natural Resources
Duration of the Program:	Two academic years
System of Study:	Semester-based

Remark: All hours in the study plan are credit hours. One credit hour = an actual hour in theory; two hours in practice and exercises, and three hours in field training.

Program Structure

Requirements	Number of Courses	Credit Hours	Relative Weight (%)
Complementary Courses	-	-	As per the decision of the Admissions Committee
Compulsory Courses	12	30	83%
Elective Courses	0	0	0%
Thesis	1	6	17%
Total	**13**	**36**	**100.00%**

First Semester

	Course Title		COURSE CODE	Credit Hours				Pre-requisites
				Th.	Pr.	Tut.	Total C.H.	
1	Applied Environmental Science		MEN101.	2	0	0	2	
2	Environmental Biology		MEN102.	3	0	0	3	
3	Environmental Chemistry		MEN103.	3	0	0	3	
4	Environmental Geology		MEN104.	3	0	0	3	
5	Energy and Climate Change		MEN105.	2	0	0	2	

6	Environmental Statistics		MEN106.	2	0	0	2	
	Total credit hours						**15**	

Second Semester

	Course Title		COURSE CODE	Credit Hours				Pre-requisites
				Th.	Pr.	Tut.	Total C.H.	
1	Environmental Pollution and Toxicology		MEN201.	3	0	0	3	
2	Biodiversity		MEN202	3	0	0	3	
3	Sustainable Development and EIA		MEN203.	3	0	0	3	
4	Solid Waste Management and Monitoring		MEN204.	2	0	0	2	
5	Remote Sensing and GIS		MEN205.	2	0	0	2	
6	Research Project and Seminar		MEN206.	2	0	0	2	
	Total credit hours						**15**	

Course Title	COURSE CODE	Credit Hours
Thesis	**–**	**6**

Elective Courses (if any)

The student has the right to choose (number of courses) from two different fields by ( ) credit hours:

	Course Title		COURSE CODE	CREDIT HOURS				Pre-requisites
				Th.	Pr.	Tut.	Total C.H.	
1								
2								
3								
4								
5								
6								
	Total credit hours							

Program Course Description:

Applied Environmental Science (2 Credit Hours):

The course aims to introduce the student to the basics of environmental science and its various applications and to identify the environmental issues of global concern at the present time.

Environmental Biology (3 Credit Hours):

The aim of this course is to provide students with detailed information related to the organization and structure of living organisms and the interaction of living things with each other and with the ecological systems in which they live. It also aims to provide students with detailed knowledge relevant to the biosphere, its various divisions, the characteristic properties of terrestrial and aquatic ecosystems, the associated living components, and the negative impacts of human beings on them.

Environmental Chemistry (3 Credit Hours):

This course introduces the basic concepts and principles of environmental chemistry sciences, such as its definition, divisions, and importance. It describes the relationship between chemistry and the environment and summarizes the major present environmental problems and the ways to solve them.

Environmental Geology (3 Credit Hours):

This course focuses on the fundamentals of physical geology, including rock types, mineral identification, plate tectonics, etc., with an emphasis on human interaction with the environment. We will explore natural processes and anthropogenic (human-impacted) effects on those processes in the context of natural hazards, natural resources, and sustainability..

Energy and Climate Change (2 Credit Hours):

The aim of this course is to identify various energy sources, whether traditional or non-traditional, to determine their environmental impacts, manage them in a way that does not harm the environment, and explore the relationship between energy usage and climate change. In addition, it aims to equip students with the knowledge of basic climate change concepts, its causes and consequences on various environmental aspects, adaptation strategies to climate change, and methods to prevent its exacerbation.

Environmental Statistics (2 Credit Hours):

This course provides students with a set of topics that benefit the environment program, including basic concepts in statistics, experimental design and analysis, and minimizing experimental errors by selecting appropriate designs and statistical methods for environmental research. It covers data recording, organization, computer entry, data interpretation, methods for displaying averages, as well as correlation analysis, regression, and tests.

Environmental Pollution and Toxicology (3 Credit Hours):

This course aims to introduce students to the basic concepts and basics of environmental pollution and toxicology, including definitions, sections, and the significance of environmental chemistry. It also provides students with crucial information in the field of environmental chemistry sciences, explaining the relationship between environmental pollution and toxicology. Furthermore, the course sheds light on the most critical issues related to environmental pollution and toxicology, along with ways to solve them.

Biodiversity (3 Credit Hours):

The aim of this course is to provide students with detailed information related to biodiversity, its importance, measurement, conservation, and sustainable use. It also aims to show the relationship between biodiversity and human health, as well as the overall health of ecological systems. It will also explore the connection of biodiversity with biotechnologies, emphasize the significance of managing genetic resources, and highlight the proper utilization of these resources.

Sustainable Development and EIA (3 Credit Hours):

The aim of this course is to introduce students to sustainable development, its goals, and the importance of these goals for the well-being of people worldwide without harming the natural environment. The course also aims to familiarize students with the methodology of the environmental impact assessment (EIA) process to achieve sustainable development.

Solid Waste Management and Monitoring (2 Credit Hours):

The topics covered in this course include the generation, processing, and disposal of municipal, industrial, and agricultural waste materials. It also addresses emerging issues such as zero waste, producer responsibility, and life cycle assessment. These topics are approached from technical, economic, and environmental perspectives, with a focus on beneficial reuse and resource recovery rather than traditional waste management. The course also highlights the interdisciplinary nature of this field and its increasing emphasis on sustainability through discussions, exercises, and projects.

Remote Sensing and GIS (2 Credit Hours):

Introduction to the theory and application of using color, infrared, thermal, and RADAR images generated from satellite and aerial photographs for geographic, geologic, environmental, and planning purposes. Introduction to the theoretical and practical understanding of fundamental GIS concepts, capabilities, and applications with an emphasis on the nature of geographic data, data input issues, data models, database design, spatial analysis, and data output. Utilization of ArcGIS software to address research problems in various disciplines.

Research Project and Seminar (2 Credit Hours):

The aim of this course is to provide students with detailed information related to the principles of scientific research, its importance, tools, and goals. It also covers scientific methods of inquiry, conducting and writing scientific research. Furthermore, the course aims to equip students with comprehensive knowledge about software programs and equipment for scientific presentations, as well as preparing and presenting seminars effectively.