Program Viewbook

Bachelor of Science in Environmental Sciences and Sustainability (BScESS)

Program Description

The Bachelor of Science in Environmental Sciences and Sustainability (BScESS) is an interdisciplinary undergraduate program that prepares graduates to address complex environmental and sustainability challenges through science-based, data-driven, and systems-oriented approaches. The program integrates core knowledge in environmental science, chemistry, biology, statistics, hydrology, environmental health, GIS, environmental economics, and policy to enable students to analyze environmental processes and human–environment interactions and support evidence-based decision-making.

Students develop theoretical and practical competencies in environmental monitoring, impact assessment, resource management, pollution control, natural hazards, and spatial and temporal data analysis, supported by tools such as statistical modeling, remote sensing, and GIS. The program emphasizes sustainability, environmental governance, and systems thinking, along with innovation and applied problem-solving, to support resilient and responsible development. Experiential learning is embedded through applied research, major electives, and internship opportunities to ensure professional readiness.

The BScESS program offers two concentration pathways: (i) Climate Change Mitigation and Adaptation, and (ii) Sustainable Development and Systems each consisting of 18 credit hours. Students are required to select one concentration pathway as part of the degree requirements. Each concentration includes three courses (nine (9) credit hours), an Internship (3 credit hours), and an Applied Research Project (6 credit hours).

Program Learning Outcomes (PLOs)

Common to both concentrations	
PLO 1	Demonstrate advanced knowledge of environmental sciences and sustainability for informed problem-solving and decisions.
PLO 2	Apply advanced skills to analyze environmental data and conduct evidence-based evaluations using appropriate tools.
PLO 3	Solve complex environmental problems using innovative and interdisciplinary approaches in diverse contexts.
PLO 4	Conduct research to analyze environmental issues and develop evidence-based solutions.
PLO 5	Manage environmental projects, demonstrate leadership, and make decisions in complex situations.
PLO 6	Demonstrate ethical behavior, responsible citizenship, and commitment to lifelong learning and entrepreneurship.
PLO 7	Communicate effectively in oral and written forms and collaborate in multidisciplinary teams to achieve sustainability goals.

PLOs for Climate Change Mitigation and Adaptation Concentration

PLO-C1 Apply climate science and carbon management knowledge to design mitigation and adaptation strategies.

PLO-C2 Develop sustainable, policy-relevant solutions to climate change challenges with professional responsibility and decision-making.

PLOs for Sustainable Development and Systems Concentration

PLO-S1 Apply systems thinking and resource management to design and evaluate sustainable development solutions.

PLO-S2 Develop circular economy solutions demonstrating leadership, sustainability responsibility, and entrepreneurship.

Program Completion Requirements

The BScESS degree shall be awarded to a student upon completing the following requirements:

- The student enrolled in the program must have passed 126 credit hours.
- The student must achieve a CGPA of not less than 2.0 on a scale of 4.0 points.
- The student must have earned at least 50% of credits at CUD.
- Internship and Applied Research Project must be completed at CUD.

Program Structure

Overview:

Core Courses	**102 Cr. Hrs.**
Electives	**6 Cr. Hrs.**
Concentration Courses (in each concentration)	**9 Cr. Hrs.**
Practical experience and Projects (in each concentration)	**9 Cr. Hrs.**
Total	**126 Cr. Hrs.**

List of Courses

I. Core Courses				
Course			**Pre/Co-requisite**	**Cr. Hrs.**
Professional Studies and General Education				**24**
Compulsory Courses				**21**
LNG	171	English I	None	3
LNG	172	English II	LNG 171	3
GED	102	AI in Modern Life	None	3
GED	190	Emirati Studies	None	3
GED	255	Critical Thinking and Problem Solving	LNG 172	3
ENT	141	Fundamentals of Innovation and Entrepreneurship 1	None	2
ENT	142	Fundamentals of Innovation and Entrepreneurship 2	ENT 141	1
ENT	241	Entrepreneurship 1	ENT 142	2
ENT	242	Entrepreneurship 2	ENT 241	1

Course			Pre/Co-requisite	Cr. Hrs.
Humanities Elective Courses (03 Credits): Students are required to select one course from the following courses				**3**
GED	103	Head Anatomy Sculpture	None	3
GED	106	Smart Decisions: Data Literacy and Visualization	None	3
GED	110	Modern Art Appreciation	None	3
GED	111	Music Appreciation and Communication	None	3
GED	191	Islamic Studies	None	3
GED	196	Communication Skills in Arabic	None	3
GED	205	Psychology in Everyday Life	LNG 172	3
GED	324	Ethical Reasoning for Today's World	LNG 172	3
GED	330	Introduction to Canadian Studies	None	3
ESS Core Courses				**78 Cr. Hrs.**
MTH	105	Introduction to Statistics	None	3
MTH	112	Calculus I	None	3
BIO	102	Biology I	None	3
BIO	202	Biology II	BIO 102	3
ENV	201	Principles of Environmental Science	None	3
ENV	220	Introduction to Environmental Health	ENV 201	3
ENV	302	Environmental Microbiology	None	3
ENV	309	Impacts of Earth Resources and Natural Hazards on the Environment	ENV 201	3
ENV	321	Management of Domestic and Hazardous Wastes	ENV 220	3
ENV	326	Indoor and Outdoor Air Pollution	ENV 220	3
ENV	330	Hydrology and Water Waste Management	ENV 201	3
ENV	412	Toxicology	BIO 202	3
ENV	413	Marine Pollution	ENV 201	3
ENV	423	Environmental Management: Theory and Practice	ENV 321, ENV 326, ENV 330, ENV 413	3
ENV	424	Impacts of Climate Change Policy on Environmental Management	ENV 326	3
SCI	210	Modern Physics	None	3
SHS	103	Chemistry	None	3
SHS	105	Organic Chemistry	SHS 103	3
SHS	205	Biochemistry	SHS 105	3
ESS	110	Principles of Sustainability	None	3
ESS	220	Energy Systems	ENV 201 and SCI 210	3
ESS	221	Environmental Economics	MTH 105 and MTH 112	3
ESS	310	Geographic Information Systems	MTH 105	3
ESS	320	Environmental Data Analytics	ESS 310	3
ESS	321	Environmental Impact Assessment	Co-req ENV 309	3
ESS	420	Environmental Law, Policy and Governance	ENV 201	3
Environmental Sciences and Sustainability Elective Courses				**6 Cr. Hrs.**
ESS	441	Urban Sustainability	ESS 110	3

Course			Pre/Co-requisite	Cr. Hrs.
ESS	442	Environmental Risk Assessment	ENV 201	3
ESS	443	ESG & Corporate Sustainability	ESS 110	3
ESS	444	Carbon Accounting & Reporting	ESS 221	3
ESS	445	Food Safety & Environmental Contaminants	ENV 201	3
II. Concentrations (Students will select one concentration pathway.)				
Concentration 1: Climate Change Mitigation and Adaptation				**18 Cr. Hrs.**
CAM	410	Climate Science and Modelling	Co-req ESS 320	3
CAM	411	Carbon Reduction Approaches	ESS 221	3
CAM	412	Climate Change Adaptation Strategies	ESS 321	3
Practical Experience and Project (The internship and projects will align with the concentration pathway.)				
CAM	413	Applied Research in Climate Change Mitigation and Adaptation	90 credit hours completed	6
CAM	414	Internship in Climate Change Mitigation and Adaptation	Minimum of 81 credit hours completed and a CGPA of at least 2.0	3
Concentration 2: Sustainable Development and Systems				**18 Cr. Hrs.**
SDS	410	Sustainable Resource Management	ENV 309	3
SDS	411	Integrated Sustainability Systems & Nexus Planning	ESS 110	3
SDS	412	Circular Economy and Policy Implementation	ENV 321	3
Practical Experience and Project (The internship and projects will align with the concentration pathway.)				
SDS	413	Applied Research in Sustainable Development Systems	90 credit hours completed	6
SDS	414	Internship in Sustainable Development Systems	Minimum of 81 credit hours completed and a CGPA of at least 2.0	3

Eight Semesters Study Plan

Concentration 1: Climate Change Mitigation and Adaptation

Sem.	Course Code		Course Title	Prerequisite	Cr. Hrs.
Semester 1	BIO	102	Biology I	None	3
	ESS	110	Principles of Sustainability	None	3
	LNG	171	English I	None	3
	SHS	103	Chemistry	None	3
	ENT	141	Fundamentals of Innovation and Entrepreneurship 1	None	2
	TOTAL				**14**
Semester 2	LNG	172	English II	LNG 171	3
	MTH	105	Introduction to Statistics	None	3
	SHS	105	Organic Chemistry	SHS 103	3
	ENT	142	Fundamentals of Innovation and Entrepreneurship 2	ENT 141	1
	BIO	202	Biology II	BIO 102	3
	GED	102	AI in Modern Life	None	3
	TOTAL				**16**
Semester 3	MTH	112	Calculus I	None	3
	GED	190	Emirati Studies	None	3
	GED	255	Critical Thinking and Problem Solving	LNG 172	3
	ENV	201	Principles of Environmental Science	None	3
	ENT	241	Entrepreneurship 1	ENT 142	2
	TOTAL				**14**
Semester 4	ENV	220	Introduction to Environmental Health	ENV 201	3
	ENV	302	Environmental Microbiology	None	3
	ENT	242	Entrepreneurship 2	ENT 241	1
	SCI	210	Modern Physics	None	3
	ESS	221	Environmental Economics	MTH 112 and MTH 105	3
	GED	XXX	Humanities Elective		3
	TOTAL				**16**
Semester 5	ESS	220	Energy Systems	ENV 201 and SCI 210	3
	SHS	205	Biochemistry	SHS 105	3
	ESS	310	Geographic Information Systems	MTH 105	3
	ENV	330	Hydrology and Water Waste Management	ENV 201	3
	ENV	309	Impacts of Earth Resources and Natural Hazards on the Environment	ENV 201	3
	TOTAL				**15**
Semester 6	ESS	320	Environmental Data Analytics	ESS 310	3
	ENV	321	Management of Domestic and Hazardous Wastes	ENV 220	3
	ENV	326	Indoor and Outdoor Air Pollution	ENV 220	3
	ESS	321	Environmental Impact Assessment	Co-req ENV 309	3
	CAM	410	Climate Science and Modelling	Co-req ESS 320	3
	TOTAL				**15**
Semester 7	ENV	412	Toxicology	BIO 202	3
	ENV	413	Marine Pollution	ENV 201	3
	CAM	411	Carbon Reduction Approaches	ESS 221	3
	CAM	413	Applied Research in Climate Change Mitigation and Adaptation*	90 credit hours completed	6
	TOTAL				**15**
Semester 8	CAM	413	Applied Research in Climate Change Mitigation and Adaptation (Cont'd.)		--
	ESS	420	Environmental Law, Policy and Governance	ENV 201	3
	ESS	XXX	Elective I		3
	ESS	XXX	Elective II		3
	CAM	412	Climate Change Adaptation Strategies	ESS 321	3
	ENV	424	Impacts of Climate Change Policy on Environmental Management	ENV 326	3
	ENV	423	Environmental Management: Theory and Practice	ENV 321, ENV 326, ENV 330, ENV 413	3
	TOTAL				**18**
Summer	CAM	414	Internship in Climate Change Mitigation and Adaptation	Minimum of 81 credit hours completed and a CGPA of at least 2.0	3
Total Credit Hours					**126**

*** Applied Research in Climate Change Mitigation and Adaptation (CAM 413)**

The Applied Research in Climate Change Mitigation and Adaptation course (6 credit hours) is delivered over two consecutive semesters to ensure a structured and comprehensive research experience. In the first semester, students focus on selecting a research topic, conducting a comprehensive literature review, defining the research problem and objectives, and developing an appropriate research methodology and design. Initial data collection may also be undertaken where applicable. In the second semester, students proceed with data analysis and interpretation, apply relevant analytical tools and models, and develop practical mitigation and adaptation solutions. The course culminates in the preparation of a final research report, along with an oral presentation and defense of the project outcomes.

Concentration 2: Sustainable Development and Systems

Sem.	Course Code		Course Title	Prerequisite	Cr. Hrs.
Semester 1	BIO	102	Biology I	None	3
	ESS	110	Principles of Sustainability	None	3
	LNG	171	English I	None	3
	SHS	103	Chemistry	None	3
	ENT	141	Fundamentals of Innovation and Entrepreneurship 1	None	2
	TOTAL				**14**
Semester 2	LNG	172	English II	LNG 171	3
	MTH	105	Introduction to Statistics	None	3
	SHS	105	Organic Chemistry	SHS 103	3
	ENT	142	Fundamentals of Innovation and Entrepreneurship 2	ENT 141	1
	BIO	202	Biology II	BIO 102	3
	GED	102	AI in Modern Life	None	3
	TOTAL				**16**
Semester 3	MTH	112	Calculus I	None	3
	GED	190	Emirati Studies	None	3
	GED	255	Critical Thinking and Problem Solving	LNG 172	3
	ENV	201	Principles of Environmental Science	None	3
	ENT	241	Entrepreneurship 1	ENT 142	2
	TOTAL				**14**
Semester 4	ENV	220	Introduction to Environmental Health	ENV 201	3
	ENV	302	Environmental Microbiology	None	3
	ENT	242	Entrepreneurship 2	ENT 241	1
	SCI	210	Modern Physics	None	3
	ESS	221	Environmental Economics	MTH 112 and MTH 105	3
	GED	XXX	Humanities Elective		3
	TOTAL				**16**
Semester 5	ESS	220	Energy Systems	ENV 201 and SCI 210	3
	SHS	205	Biochemistry	SHS 105	3
	ESS	310	Geographic Information Systems	MTH 105	3
	ENV	330	Hydrology and Water Waste Management	ENV 201	3
	ENV	309	Impacts of Earth Resources and Natural Hazards on the Environment	ENV 201	3
	TOTAL				**15**
Semester 6	ESS	320	Environmental Data Analytics	ESS 310	3
	ENV	321	Management of Domestic and Hazardous Wastes	ENV 220	3
	ENV	326	Indoor and Outdoor Air Pollution	ENV 220	3
	ESS	321	Environmental Impact Assessment	Co-req ENV 309	3
	SDS	410	Sustainable Resource Management	ENV 309	3
	TOTAL				**15**
Semester 7	ENV	412	Toxicology	BIO 202	3
	ENV	413	Marine Pollution	ENV 201	3
	SDS	411	Integrated Sustainability Systems & Nexus Planning	ESS 110	3
	SDS	413	Applied Research in Sustainable Development Systems*	90 credit hours completed	6
	TOTAL				**15**
Semester 8	SDS	413	Applied Research in Sustainable Development Systems (Cont'd.)		--
	ESS	420	Environmental Law, Policy and Governance	ENV 201	3
	ESS	XXX	Elective I		3
	ESS	XXX	Elective II		3
	SDS	412	Circular Economy and Policy Implementation	ENV 321	3
	ENV	424	Impacts of Climate Change Policy on Environmental Management	ENV 326	3
	ENV	423	Environmental Management: Theory and Practice	ENV 321, ENV 326, ENV 330, ENV 413	3
	TOTAL				**18**
Summer	SDS	414	Internship in Sustainable Development Systems	Minimum of 81 credit hours completed and a CGPA of at least 2.0	3
Total Credit Hours					**126**

*** Applied Research in Sustainable Development Systems**

The Applied Research in Sustainable Development Systems course (6 credit hours) is offered across two consecutive semesters to provide a coherent and in-depth research experience. During the first semester, students identify a suitable research topic within the field of sustainable development systems, carry out an extensive literature review, formulate the research problem and objectives, and design an appropriate research methodology. Where applicable, preliminary data collection may also be initiated. In the second semester, students focus on analyzing and interpreting data, utilizing relevant analytical tools and systems-based frameworks, and developing practical solutions that support sustainable resource management and circular economy practices. The course concludes with the submission of a comprehensive research report, accompanied by a formal presentation and defense of the research findings.