Academic Programs Booklet

College of Science

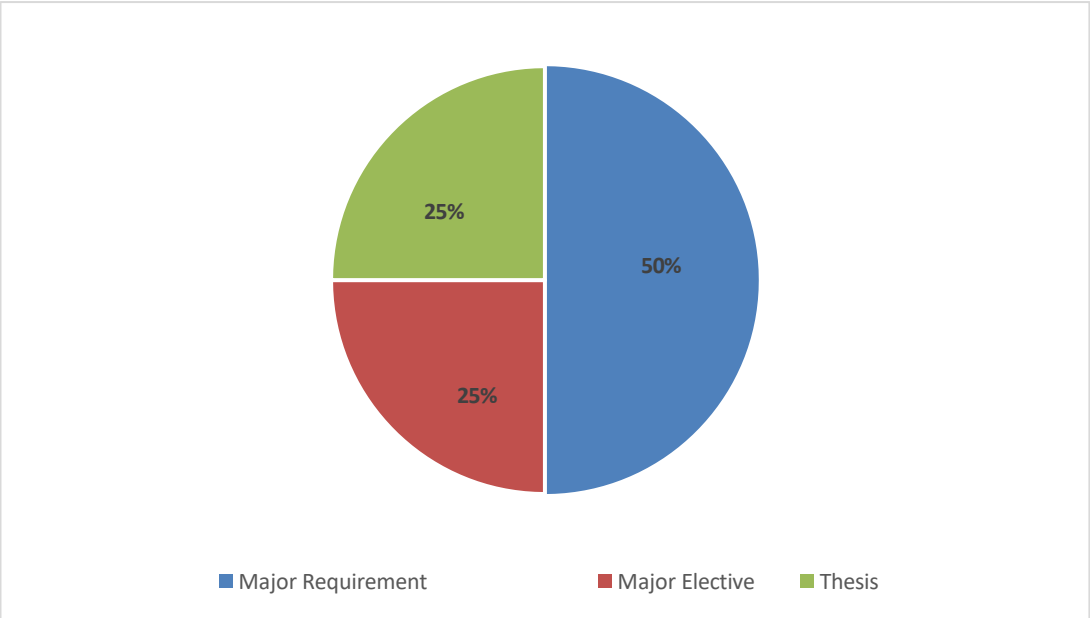
2025

Prepared By: VP For Academic Programs and Graduate Studies Office

College of Science

Master in Environment and Sustainable Development (2025)

Program Components



Course Type	CRD
Major Requirement (MR)	**18**
Major Elective (ME)[1]	**9**
Thesis	**9**
Total Credit (CRD)	**36**

Teaching Language: English

[1] Student must select **three** courses from Major Electives (ME) List.

Detailed Study Plan

Year 1- Semester 1

Course Code	Course Title	Course Hours			Course Type	Pre-Requisite	Major GPA
		LEC	PRAC	CRD			
ESD 601	Environmental Science	3	0	3	MR	---------	Yes
ESD 603	Environmental Economics	3	0	3	MR	---------	Yes
ESD 647	Research Methods	3	0	3	MR	---------	**No**

Year 1- Semester 2

Course Code	Course Title	Course Hours			Course Type	Prerequisite	Major GPA
		LEC	PRAC	CRD			
ESD 602	Environmental Law	3	0	3	MR	---------	Yes
ESD 651	Waste Management	3	0	3	MR	---------	Yes
ESD 611	Energy and the Environment	3	0	3	MR	---------	Yes

Year 2- Semester 3

Course Code	Course Title	Course Hours			Course Type	Prerequisite	Major GPA
		LEC	PRAC	CRD			
ESD 6XX	Elective Course	3	0	3	ME	---------	Yes
ESD 6XX	Elective Course	3	0	3	ME	---------	Yes
ESD 6XX	Elective Course	3	0	3	ME	---------	Yes

Year 2- Semester 4

Course Code	Course Title	Course Hours			Course Type	Prerequisite	Major GPA
		LEC	PRAC	CRD			
ESD 649	Thesis	0	27	9	Thesis	According to Post Graduate Studies Regulations	No

Major Elective Courses List

Course Code	Course Title	Course Hours			Course Type	Pre requisite	Major GPA
		LEC	PRAC	CRD			
ESD 653	Biodiversity and Conservation	3	0	3	ME	None	Yes
ESD 614	Desert Ecology and Desertification	3	0	3	ME	None	Yes
ESD 652	Climate Change and Air Quality	3	0	3	ME	None	Yes
ESD 626	Environmental Impact Assessment	3	0	3	ME	None	Yes
ESD 634	Marine Pollution	3	0	3	ME	None	Yes
ESD 654	Environmental Radiology and Radiation Protection	3	0	3	ME	None	Yes
ESD 646	Special Topics in Environmental Science	3	0	3	ME	None	Yes
ESD 656	Water Resources Management	3	0	3	ME	None	Yes

Course Description

Course Code: ESD 601 **Course Title:** Environmental Science
Environment and Ecology; relationship between man and the environment. Industrialization and urbanization and its effect on the environmental quality. Earth and biogeochemical cycles. Life and environmental ecosystems, nutrient cycling, ecosystem and population balance. Natural and renewable resources: mineral, biota, trash, energy, soil, water, fossil, fuel, nuclear and alternative energy. Human population. Water and wastewater management. The atmospheric environment; climate and climatic changes. Soil and land use. Air, Soil and water pollution and environmental hazards. Pollution prevention, environmental preservation and protection.

Course Code: ESD 602 **Course Title:** Environmental Law
Environmental laws, techniques: prevention, implementation, enforcement and remedial measures. International Laws, conventions and agreements. Regional conventions and agreements. National laws, by-laws, legislation and standards on: air, water, soil, noise, light, radiation, oil, hazardous material, waste, dumping, marine, terrestrial, hunting, fishing, exploitation, liability, compensation, environmental protection, pollution prevention and control. Bahrain s regulations compared with regional and international laws.

Course Code: ESD 603 **Course Title:** Environmental Economics
Understand how economic methods can be applied to environmental issues facing society; Understand difficulties arising in using economic analysis in environmental policy design; Solve and manipulate a variety of diagrammatic and algebraic models in environmental economics and critically evaluate these models; Be familiar with a number of real world environmental policy problems and understand how economic analysis has been applied in their solution.

Course Code: ESD 614 **Course Title:** Desert Ecology and Desertification
Ecological processes, biodiversity, and environmental challenges of desert ecosystems; interactions between climate, soil, vegetation and wildlife in arid and semi-arid environments; desertification causes, consequences, and potential mitigation strategies.

Course Code: ESD 653 **Course Title:** Biodiversity and Conservation
Concepts and applications of biodiversity conservation, including biological biodiversity and its value, human threats to biological diversity, conservation approaches at the population and species levels, protecting and managing habitats and ecosystems, and sustainable development.

Course Code: ESD 626 **Course Title:** Environmental Impact Assessment
Environmental Impact Assessment (EIA) process; including objectives, legislative contexts, screening, scoping, impact prediction and evaluation, mitigation, monitoring, effectiveness, and strategic environmental assessment

Course Code: ESD 611 **Course Title:** Energy and The Environment
Introduction: definition, use, environmental consideration, sources of conventional energy. Air pollution and energy use. Sources of renewable energy: solar, wind, biomass, hydroelectricity, geothermal and temperature differences energy. Environmental consideration of renewable energy sources.

Course Code: ESD 652 **Course Title:** Climate Change and Air Quality
The earth's atmosphere, air circulation and weather patterns. Air pollution, sources of air pollution. Effects of air pollution and synergistic effects of air pollutants. Meteorological aspects of air pollutants. Local, regional, and international aspects of air pollution. Air pollution and global climate. Air quality and standards. Methods of measurements of air quality and air pollution control.

Course Code: ESD654 **Course Title:** Environmental Radiology and Radiation Protection
Environmental radiology, radiation sources, radiation measurement, and health effects of environmental radiation. Radiation detection instruments, radiation data analysis, and radiation protection principles. Environmental impact of radiological practices, sustainable radiology, and emergency preparation. Case studies of radiation impact. Monitoring and mitigation radiation exposure. Promoting public health and environmental sustainability.

Course Code: ESD 611 **Course Title:** Waste Management
The course will include the Legislative background against which the current waste management is conducted. Dealing with ways of reducing waste quantities. Discussing the landfill disposal of waste materials and assessing the problems and reduce by using good practices.

Course Code: ESD 634 **Course Title:** Marine Pollution
Overview of coastal pollution, sewage, industrial and solid waste, organic and inorganic pollutants, and radioactive materials. Sources, pathways, fate in ecosystems, and impacts like eutrophication and biodiversity loss. Effects on mangroves, organisms, human health, aesthetic values, and socio-economic aspects. Pollution monitoring, prevention, public awareness, and global conventions on prevention of marine pollution.

Course Code: ESD 656 **Course Title:** Water Resources Management
Techniques for hydrological analysis, watershed management, and sustainable resource allocation. Principles of balancing ecological, social, and economic water needs. Exploration of institutional frameworks, transboundary water management, and stakeholder engagement. Impacts of climate variability on water systems and adaptation strategies for resilience.

Course Code: ESD 646 **Course Title:** Special Topics in Environmental Science
This course explores contemporary and emerging topics in environmental science, emphasizing interdisciplinary approaches to understanding and addressing environmental challenges. The specific focus may vary each semester, reflecting advancements in the field and current global environmental issues.

Course Code: ESD 647 **Course Title:** Research Methods
Principles and basics of research, the structures of research, research ethics, searching and reviewing the literature, Research methods, collecting and analyzing data, qualitative data analysis, and writing the proposal and writing up the research.

Course Code: ESD 649 **Course Title:** Thesis
In partial fulfilment of the Master program in Environment and sustainable development (ESD), the student must conduct research work, write up and successfully defend a thesis in a field of interest in ESD. The research project is carried out under the supervision of a faculty member. The program committee must approve the topic of the thesis.