University of Derna
Faculty of Natural Resources and Environmental Sciences
Department of General Orientation
Study Plan

The Courses for the Department of Environmental Sciences
First Year

Autumn Semester

No	Course Title	Units
AR 103	Arabic Language	2(0-2)
ZO 021	General Zoology	3(3-2)
CH 011	General Chemistry	3(3-2)
MA 011	General Mathematics	3(3-2)
EL 011	English Language 1	2(0-2)
64105	Introduction To Natural Resources	3(3-2)
EC 110	Principles of Economics	3(0-3)
Total Units		19

Spring Semester

No	Course Title	Units
PH 011	General Physics	3(3-2)
CH 351	Analytical Chemistry	3(3-2)
BO 021	General Botany	3(3-2)
62152	General Ecology	3(3-2)
ET 011	Environmental terms	2(0-2)
ST 011	Principles Statistics	3(3-2)
CS 011	Computer Science	2(0-2)
Total Units		19

Syllabus of General Orientation Department Courses

Arabic Language	2 (0-2)- AR103

Arabic Grammar and Morphology. Rhetorical Styles. Written Expression Skills. Analytical Reading of Literary Texts. Linguistic Applications in Scientific Writing

General Zoology	3 (3-2) ZO 021

Classification of the Animal Kingdom. Internal and External Anatomy. Major Body Systems. Reproduction. Animal Diversity. Ecological and Economic Significance

General Chemistry	3 (3-2) - CH 011

Atoms and Elements. Chemical Bonds. Reactions and Equations. Solutions. Acids and Bases. Thermodynamics. Introduction to Organic Chemistry

General Mathematics	3 (3-2) - MA 011

Algebra. Equations. Functions. Differential and Integral Calculus. Matrices. Basic Statistics. Mathematical Applications in Environmental Sciences

English Language 1	2(0-2) 1 - EL 011

Basic Scientific Vocabulary. Reading and Comprehension. Grammar. Academic Writing Skills. Conversation and Listening within Scientific Contexts

Introduction To Natural Resources	3(3-2) -64105

Introduction. General concepts and definitions. Classification of natural resources. Importance and future of resources. Water and its sources. Marine resources, wildlife, and overfishing. Forests. Rangelands. Agricultural lands. Soil, its importance, and classifications. Study of oil and natural gas. Study of coal. Study of important mineral ores. The importance of oil, natural gas, coal, and mineral ores in the economy. Natural resources and the environment.

Principles of Economics	3 (0-3) - EC 110

General Economic Concepts. Supply and Demand. Production. Consumption. Market and Prices. Economic Policies and Their Relationship to the Environment

General Physics	3 (3-2) - PH 011

Mechanics. Energy. Heat. Electricity and Magnetism. Light. Sound. Applications in Resources and the Environment

Analytical Chemistry	3 (3-2) - CH 351

Gravimetric and Volumetric Analysis. Qualitative and Descriptive Analysis. Titration Techniques. Use of Analytical Instruments in the Laboratory

General Botany	3 (3-2) - BO 021

Plant Anatomy. Plant Physiology. Classification. Reproduction. Relationship with the Environment. Importance of Plants in the Ecosystem

General Ecology	3 (3-2) -62152

General Concepts. Ecology and ecosystem models. Energy flow. Various cycles and their impact. Effects of the surrounding environment. Formation of ecosystems. Characteristics, growth, and composition of populations and the relationships between them. Different terrestrial and aquatic ecosystems. Individual behavior and the organization of ecosystems. Population dynamics and the organization of biological communities. General concepts on surveying and measuring different ecosystems. Ecosystems in Libya and the Green Mountain (Al Jabal al Akhdar).

Environmental terms	2 (0-2) - ET 011

Scientific Terminology in Arabic and English related to the Environment. Using Scientific Dictionaries. Translation of Scientific Terms. Environmental Translation Skills

Principles Statistics	3 (3-2) - ST 011

Data and its Types. Measures of Central Tendency. Dispersion. Probability Distributions. Correlation and Regression. Statistical Applications in Environmental Sciences

Computer Science	2 (0-2) - CS 011

Computer Components. Operating Systems. Word Processing and Spreadsheet Software. Internet and Scientific Research. Introduction to Programming

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The Courses for the Department of Environmental Sciences

Second Year

Autumn Semester

No		Course Title	Units
CH 231		Organic Chemistry	3(3-2)
62248		Plant Classification and anatomy	3(3-2)
61201		Prnc. of Forest & Range Sciences	3(0-3)
62251		Introduction to Climatology	3(0-3)
61282		Plant Physiology	3(3-2)
62292		Environmental Pollution	3(0-3)
64345		Ground Survey and Photogrammetry	3(3-2)
64108		General Geology	3(0-3)
Total units		24	

Spring Semester

No		Course Title	Units
CH 241		General Biochemistry	3(3-2)
62271		Plant Ecology	3(3-2)
62210		Elements of Meteorology	3(3-2)
62212		Principles of Soil Science	3(3-2)
62273		General Microbiology	3(3-2)
64321		Geographical Information System	3(3-2)
62240		Ecotourism	3(0-3)
62285		Dry land Forestry	3(0-3)
Total units		24	

Third Year

Autumn Semester

No		Course Title	Units
61342		Nat. Res. Measurements	3(0-3)
62344		Principles of Sustainable Development	3(0-3)
EC 217		Research Methodology	2(0-2)
63408		Marine Pollution	3(0-3)
62341		Environmental Chemistry I	3(3-2)
62374		Applied Microbiology	3(3-2)
62201		Ecological Issues	3(0-3)
Total Units		19	

Spring Semester

No		Course Title	Units
61352		Parks and Recreation	3(0-3)
61372		Forest and Range Ecology	3(0-3)
62361		Environmental Chemistry II	3(3-2)
62380		Waste Management and Recycling	3(3-2)
AG 205		Experimental Design	3(3-2)
62394		Spring Field Practicum	1(4-0)
62347		Ecological Statistics	3(3-2)
Total Units		19	

Forth Year

Autumn Semester

No	Course Title	Units
62401	Waste Water Treatment	3(0-3)
62471	Lands Managing Protected & Preserved	3(0-3)
62484	Environmental Hydrology	3(3-2)
62431	Geographical Plant Ecology	3(3-2)
62450	Environmental Management	3(3-2)
62463	Environmental Plant Physiology	3(0-3)
NL100	National Culture	(2-0)2
62492	Seminar	1(4-0)
Total units	21	

Spring Semester

No	Course Title	Units
EC 303	Environmental Economics	3(0-3)
62448	Plant Community	3(0-3)
62451	Desert Ecology	3(0-3)
62438	Soil – Water –Plant Relations	3(3-2)
62405	Pesticides and the Environment	3(3-2)
62420	Methods In Pollution Analysis	(2-3)3
62445	Independent Study	2 (0-2)
Total units	20	

Syllabus of Environmental Sciences Department Courses

Fundamentals of Environmental Science (0-3)- 62105

Prerequisite: General Environment

Concept of Environmental Sciences. Population, Food, and Agriculture. Contemporary Environmental Issues. Biogeochemical Cycles. Ecological Succession, Biodiversity, and the Role of Humans. Organic Agriculture. Fossil Fuels. Nuclear Energy. Renewable Energies.

General Ecology 3(0-3)- 62152

Prerequisite: General Zoology, General Botany

General Concepts. Biology and Ecosystem Models. Energy Flow. Various Cycles and Their Impact. Effects of the Surrounding Environment. Formation of Ecosystems. Characteristics, Growth, and Formation of Populations and the Relationships Between Them. Different Terrestrial and Aquatic Ecosystems. Individual Behavior and the Organization of Ecosystems.

General Microbiology 3 (3-2)- 62273

Prerequisite: General Botany

General Introduction. Classification and Division of Microorganisms. Distribution and Importance. Fungi. Algae. Protozoa (Unicellular Animals). Viruses. Bacteria. Morphology and Internal Anatomy of Bacteria. Classification of Bacteria, Culturing, and Types of Media. Reproduction and Nutrition. Soil Microbiology and Its Role in Chemical Transformations. Carbon, Nitrogen, and Sulfur Cycles. Importance of Mycorrhizae, Bacteria, and Frankia for Trees. Economic Importance of Microorganisms. Environmental Microbiology. Applications.

Environmental Pollution 3 (0-3)- 62292

Prerequisite: General Environment or Fundamentals of Environmental Sciences

Principles of Environmental Pollution. General Definitions. Types of Pollution. Causes. Sources of Pollutants (Gases and Compounds). Acid Rain. Agricultural Land Pollution. Food Contamination. Waste and Its Categories. Noise Pollution. Impact of Pollution. Marine Pollution. Different Measurements. Pollution Control and Mitigation. Economics of Pollution. Specialized Organizations. Local Laws and Regulations.

Elements of Meteorology | 3 (3-2) - 62210

Prerequisites: General Physics. General Mathematics.

General Concepts. Air Masses. Fronts. Clouds. Fog. Atmospheric Humidity. Cyclone Waves. Thunderstorms. Precipitation. Air Pollution. Weather Forecasts. The practical component includes training on various meteorological instruments.

Principles of Soil Science | 3 (3-2) - 62212

Prerequisite: General Physics, General Mathematics

General Concepts. Air Masses. Fronts (Meteorological). Clouds. Fog. Atmospheric Humidity. Cyclone Waves. Thunderstorms. Precipitation. Air Pollution. Weather Forecasting. Practical work includes training on various meteorological instruments.

Ecotourism | 3 (0-3) - 62240

Prerequisite: General Environment

General Introduction. The Concept and Importance of Tourism. Tourism in Gardens and Parks. Forest Tourism. Desert and Oasis Tourism. Tourism and Environmental Awareness. Tourism in Geological and Topographical Features. Tourism and Wildlife and Birds. The Impact of Tourism on the Environment. Identification of Ecotourism Sites. Economics of Ecotourism.

Plant Classification and Taxonomy | 3 (3-2) - 62248

Prerequisite: General Botany

Scientific Description of Plants and the Terminology Used. Orders and Families. Angiosperms (Flowering Plants) and Gymnosperms (Naked-Seed Plants). Characterization of Families of Flowering Plants. Principles of Classification of Families and Species. The Relationship Between Classification and the Environment. Scientific Nomenclature. Methods of Collecting and Preserving Plant Specimens, with Emphasis on Important Species. Anatomical Structure of Different Plant Parts. Monocotyledons and Dicotyledons. Study of Structural Evolution. Emphasis on Microscopic Study and the Collection and Identification of Species.

Introduction to Climatology | 3 (0-3) - 62251

Prerequisite: Elements of Meteorology

Importance of Climatology and Its Relation to Other Sciences. The Atmosphere: Its Components and Applications. Radiative and Thermal Balance. Calculation of Temperature Averages. Winds: Their Types and Characteristics. Different Wind Cycles. Rainfall. Types of Climate and Their Characteristics. Local Climate. Climatic Classifications and Changes.

Plant Ecology | 3 (3-2) - 62271

Prerequisite: General Environment, General Botany, Principles of Statistics

General Introduction. Plant Communities: Their Distribution, Variations, and Relationship to Environmental Conditions. Study and Analysis of Plant Communities. Samples and Quadrats. Competition and Succession. Nutrient and Water Cycles in Ecosystems. Energy Flow. Plant Communities as a Reflection of Environmental Conditions. Divisions of Different Environments for Plant Communities in Libya. Formation of Climax Vegetation Types in Libya. Applications in the Analysis and Measurement of Plant Communities.

Dry land Forestry | 3 (0-3) - 62285

Prerequisite: Plant Ecology, Fundamentals of Forestry and Rangelands

Farm Animal Production and Rangeland Management. Limited Crop Production. Watershed Management. Wildlife and Recreation in Managed Forests. Investment and Evaluation of Forestry Projects. Multiple-Use Management. Nurseries and the Development of Managed Forest Administration. Natural Forest Management. Products of Natural Forests. Sand Dune Fixation and Windbreaks. Soil Conservation and the Cultivation of Saline Lands. Awareness for the Conservation of These Forests.

Environmental Chemistry I | 3 (0-3) - 62341

Prerequisite: General Chemistry, Analytical Chemistry, Organic Chemistry

Introduction. General Concepts. Origin and Evolution of the Earth. Energy and Its Theoretical Treatment. Biogeochemical Cycles. Fossil Fuels. New Energy Sources. Energy Storage and Distribution. The Atmosphere. Air Pollution. Mineral Resources. Clay Minerals and Soil. Solid Waste. Water and Its Properties. Wastewater Treatment. Toxic Materials.

Princ. of Sustainable Development | 3 (0-3) - 61344

Prerequisite: Fundamentals of Forestry, Plant Ecology

General Introduction. Definition and Importance of Sustainable Development. Improvement of Living Conditions. Sustainability of Natural Resources and Environmental Conditions. Protection of the Ecosystem. Global Agreements on Sustainable Development. Development and Compliance with the Terms of Agreements. Methods of Applying Sustainable Development to Local Natural Resources.

Ecological Statistics 3 (3-2) - 62347

Prerequisite: Plant Ecology

General Concepts. Statistics and Sampling. Biological Communities: Their Behavior and Methods of Study. Ecological Community Data. Analysis of Spatial Patterns. Abundance and Species Relationships. Species Affinity. Classification of Communities. Structure of Communities. Interpretation of Communities. Biodiversity and Its Calculations. Field Applications and Exercises.

Environmental Chemistry II | 2 (3-0) - 62361

Prerequisite: Environmental Chemistry (I)

Sample Collection and Statistics. Measurement of Air Pollution. Principles of Various Analytical Methods. Monitoring Water Quality Parameters. Principles of Spectral Emission Methods and Gas Chromatography, etc. Nature of Soil Pollutant Systems. Sample Collection and Conducting Various Analyses.

Applied Microbiology 3 (3 – 2) - 62374

Prerequisite: General Microbiology

Microorganisms (microbes) are found everywhere around us; therefore, this course focuses on studying microbes in various environments, including air, water, soil, and the human body. It also examines the beneficial and harmful roles of microbes in different ecosystems and the methods for identifying, isolating, and characterizing these organisms in their natural habitats.

Waste Management and Recycling | 3 (3-2) - 62380

Prerequisite: Environmental Pollution

General Introduction. Classification of Solid Waste. Municipal and Industrial Landfills. Separation and Recycling Centers. Recycling of Metallic Materials. Recycling of Plastics and Glass. Reuse of Waste. Recycling of Agricultural Waste. Economic and Environmental Factors of Recycling. Monitoring and Visits to Recycling Facilities. Landfill Monitoring.

Spring Field Practicum — 1 (0-4) - 62394

Faculty members prepare a program for the laboratory and field training of students on the material they have studied or are currently studying in their third year. The duration of the training ranges from one to two weeks.

Waste Water Treatment — 3 (3-2) - 62401

Prerequisite: Environmental Pollution, Fundamentals of Soil Science

Various Sources of Wastewater. Different Purification Technologies. Minimization of Wastewater. Wastewater Recycling and Reuse. Methods of Utilizing Treated Wastewater. Estimation of Quantities and Sources of Wastewater in Neighboring Regions.

Pesticides and the Environment — 3 (0-3) - 62405

Prerequisite: General Chemistry, Organic Chemistry

General Introduction. Importance of Pesticides. Uses of Pesticides. Types of Pesticides. Different Classifications. Harmful Effects of Pesticides. Methods of Preventing Toxicity from Different Pesticides. Methods of Detecting Pesticide Residues in Agricultural Products, Soil, and Water. Health and the Environment.

Methods In Pollution Analysis — 3 (3-2) - 62420

Prerequisite: Environmental Pollution, Pesticides and the Environment

Analytical Instruments. Fundamentals of Soil Science. Principles and Methods of Sample Collection for Analysis. Sample Analysis. Interpretation of Results. Sampling Methods and Experimental Designs Used. Chemical Analysis Techniques. Performing Calculations and Spatial Analysis. This course covers various methods for measuring pollution, with a focus on measuring water pollution. By the end of the course, students should be able to use the available instruments to measure pollutants.

Geographical Plant Ecology — 3 (0-3) - 62431

Prerequisite: Plant Ecology, Principles of Climatology

General Concepts. Continental Drift and Its Relationship to the Distribution of Plants and Animals Among Continents. The Influence of Climate and Ocean Currents on Plant Distribution. Ecological Isolation and Oceanic Islands and Their Effect on Species Composition and Morphology. Plant Dispersal Between Islands and Continents. Plant Communities and the Reasons for Their Distribution Across Continents. The Mediterranean Climate and Its Plant Communities. Dynamics of Plant Communities. The Impact of Climate on the Morphology and Physiology of

Trees in Different Environments. The Environment and Local Communities and the Principles of Their Classification.

Soil Water Plant Relations 3 (2-3) - 62438

Prerequisite: Plant Ecology, Plant Physiology, Fundamentals of Soil Science

Study of the Factors Controlling Water Flow and Availability in Saturated and Unsaturated Soil. Methods and Instruments Used for Measuring Soil Moisture. How Plants Obtain Water. Factors Controlling the Transport of Water, Salts, and Sap. The Relationship of Climatic Factors to These Processes. Instruments Used for Different Measurements. Emphasis on the Applications of the Soil-Water Relationship to the Course "Watershed Management".

Independent Study 2 (4-0) - 62445

The student studies a topic in the field or laboratory under the supervision of a faculty member, serving as their graduation project. The objective is to introduce the student to the scientific research methodology.

Plant Community 3 (2-3) - 62448

Prerequisite: Introduction to Forestry and Rangelands, Plant Ecology

General Introduction. Concepts of Communities. Methods and Schools of Classification of Different Plant Communities. Principles of Classification. The Concept of Biome and Its Applications. The Influence of Climate and Environment on the Structure of Plant Communities. Association and Succession. Descriptive and Quantitative Methods for Surveying and Studying Plant Communities. Principles of Classification of Plant Communities in Libya. How to Classify the Plants of the Green Mountain (Al Jabal Al Akhdar).

Environmental Management 3 (0-3) - 62450

Prerequisite: Environmental Ecology, Ecological Statistics

General Introduction. Ecological Analysis of Physical and Biological Pollutants in Natural Resource Systems. Formulation and Evaluation of Hypotheses in Human-Influenced Ecosystems. The Use of Statistics, Ecological Patterns, and Management in an Integrated Environmental Management System. Focus on a Specific Area in the Green Mountain (Al Jabal Al Akhdar).

Desert Ecology 3 (0-3) - 62451

Prerequisite: Plant Ecology, General Zoology

The Concept of Desert and Desertification. Desert Climate. Desert Plants. Methods and Patterns of Desert Classification. Different Strategies of Plants to Tolerate Desert

Conditions. Desert Animals. Adaptation of Desert Animals to Environmental Conditions: Tolerance, Reproduction. Structure of Some Desert Communities. Study of Some Deserts in the World. Different Examples.

Environmental Plant Physiology — 3 (3-2) - 62463

Prerequisite: Plant Physiology, Plant Ecology

General Introduction. The Effect of the Environment as an Integrated Unit on Plant Growth and Distribution. Different Morphological and Physiological Traits of Plant Adaptation to Environmental Conditions. The Effect of Light (Quantity and Quality). The Effect of Water and Various Physiological Processes. Humidity, Extreme Humidity and Temperature Levels, and How Plants Respond to Them. Other Physiological Processes Related to the Environment. The Effect of the Environment on Plant Distribution.

Lands Managing Protected & Preserved — 3 (0-3) - 62471

Prerequisite: Plant Ecology, Biodiversity

General Introduction. The Concept of Natural Reserves and Protected Areas. How to Identify Endangered Species. Identification of Protected and Conserved Areas. Humans and the Biosphere. Different Ecological Methods for Species Conservation. Methods of Managing These Areas. Applying Sustainable Development to These Areas Through Their Natural Resources. Global and Local Organizations Related to Reserves.

Environmental Hydrology — 3 (3-2) - 62484

Prerequisite: Fundamentals of Soil Science, Environmental Pollution

General Introduction. General Concepts of Pollution. Water Pollution. Fundamental Physical and Chemical Principles Describing the Fate and Transport of Pollutants in Various Aquatic Systems. With a study of topics relevant to the city of Al-Bayda and surrounding areas.

Seminar — 1(4-0) - 62492

The student prepares a topic of interest for study under the supervision of a faculty member, which can serve as a special study course. The objective of this course is to train students on preparing and delivering seminars.