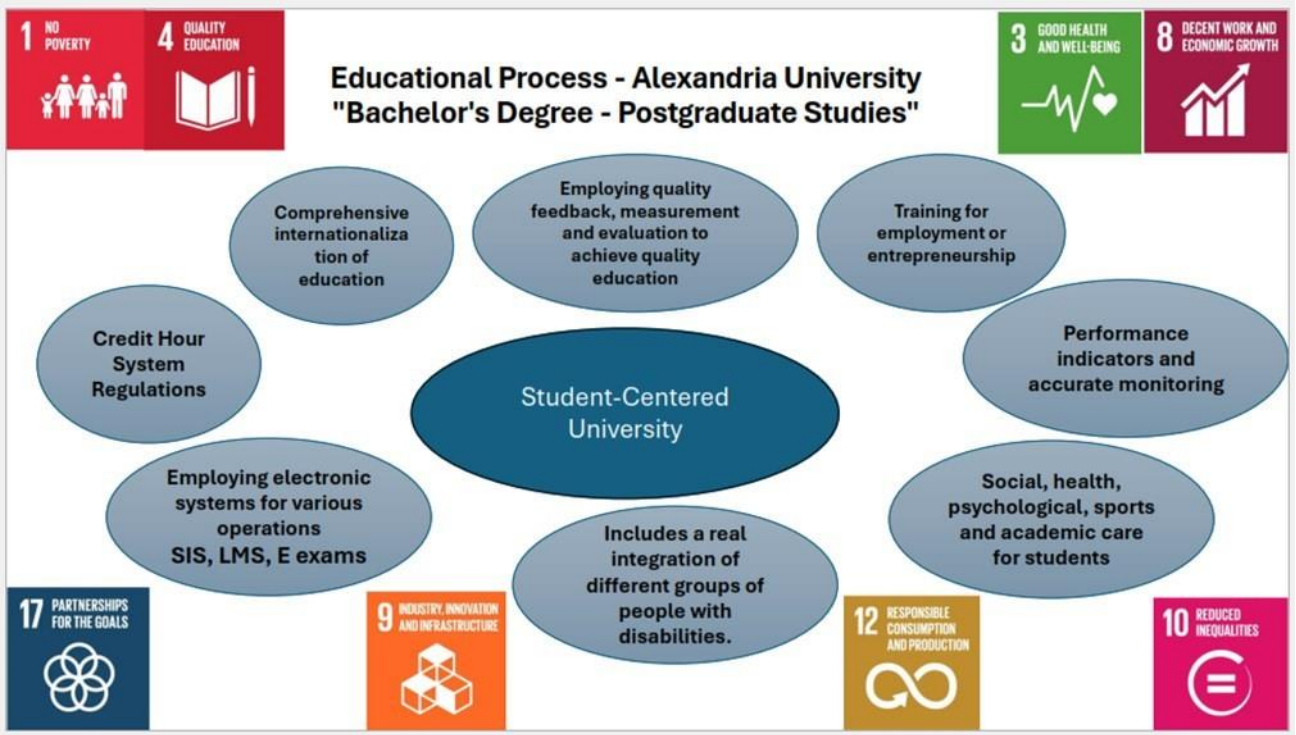
Courses that teach specifically on climate science and/or environmental sustainability



Number of Courses/Subjects Related to Sustainability Offered

Alexandria University offers a group of courses related to the environment and sustainability in various sectors, in line with the state's strategies to achieve sustainable development goals and to achieve the goals of linking science with industryand qualifying the graduate to find job opportunities commensurate with the field of specialization. The university works to qualify the graduate by providing various awareness and training programs during the study period. The university also providesa distinguished group of postgraduate programs that are compatible with their counterparts in international universities, as indicated by the indicator data for this standard.

A. An academic team (Ph.D.) from the Faculty of Science at Alexandria University teaches a course titled 'Man and Environment' (University Elective Course – 2 Credits). The course addresses

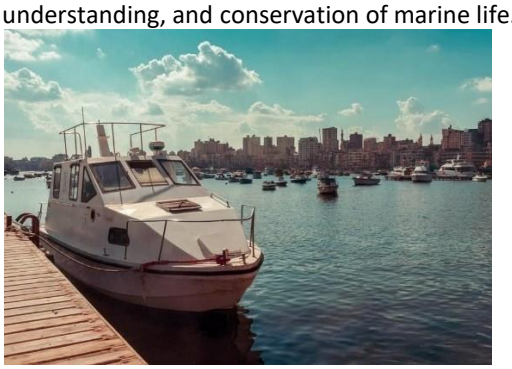
environmental problems, types of natural resources, pollution, environmental footprint, carbon footprint, waste management, recycling, climate change and global warming, biodiversity, and the Sustainable Development Goals (SDGs). It is offered to students from various faculties at Alexandria University, such as:

Faculty of Science
Faculty of Tourism
Faculty of Agriculture
Faculty of Sport Education
Faculty of Business
Faculty of Computers and Data Science
Faculty of Dentistry
Faculty of Economics and Political Science
Faculty of Arts
Faculty of Nursing

Also, this course is offered in some programs at Alexandria National University, including:

Computer and Data Sciences (CDS) Programs
Oral and Dental Surgery Program
Software and Multimedia Production Program (SIM)

Courses focused on marine environments and the sustainability of marine ecosystems make use of the Research Yacht,located at the Faculty of Science in the Anfoushi area and equipped with a GPS system. Students and researchers utilizethe yacht for field trips to collect samples and conduct essential studies. This access to the Research Yacht greatly supports the study, understanding, and conservation of marine life.



Example of Programs and Courses/Subjects Related to Sustainability (Alexandria University, Egypt):

- Man and Environment
- Living resources and taxonomy
- Economic botany and biofuel
- Plant biotechnology and species conservation
- Water treatment and water analysis
- Plant propagation and tissue culture
- Algal Biotechnology
- Taxonomy of flowering plants
- Plant anatomy and ecology
- Quality criteria for biological applications
- Biology of Microorganisms
- Microbial diversity
- Research project
- Field study
- Environmental geology
- Marine plankton
- Marine chemistry
- Fish biology and fisheries
- Marine benthos
- Marine ecology

Marine pollution
Coastal zone management
Aquatic aquaculture
Effect of climate changes on marine ecosystem
Marine microbiology
Marine biodiversity
Regional oceanography
Conservation and sustainable development of natural resources
Environmental bioremediation
Physicochemical Processes in Environmental Engineering
Sustainable Built Environment
Sustainable Water Resources Development
Environmental Sampling and Analysis
Unit Operation for Environmental Engineers
Thermodynamics for Environmental Engineers
Environmental Microbiology
Environmental Aquatic Chemistry
Environmental Organic Chemistry
Climate Change
The Nile; Environments, Limnology & Human Use
Site Assessment and Remediation
Climate Systems
Advanced Environmental Engineering
Integrated Environmental Assessment
Environmental Impacts of Power Generation
Environmental Sensor Informatics
Cities and the Challenge of Sustainable Development
Green Entrepreneurship and Agribusiness
Sustainable Energy Resources and Management
Sustainable Management of Marginal Drylands
Sustainable Farming Systems: Hydro and Aquaponics
Sustainable Development
Environmental Hydrology
Projects Management
Fundamentals of environmental sciences
Sustainable development
Climate dynamics
Climate change mitigation, vulnerability and adaptation
Environmental economics and management
Statistical analysis in climate research
Economic valuation and climate change
Green economy
Geographical information systems applications in climate change
Remote sensing and environmental change
Environmental risk assessment and management
Community engagement and sustainable development
Climate change, biodiversity and ecosystems functions
Climate change and health
Urban environment
Geopolitics of climate change
Scientific research skills
Introduction to Climate Change
Meteorology and Climate Observation
Marine Resources and sustainability
Environment Risk Assessment and Management

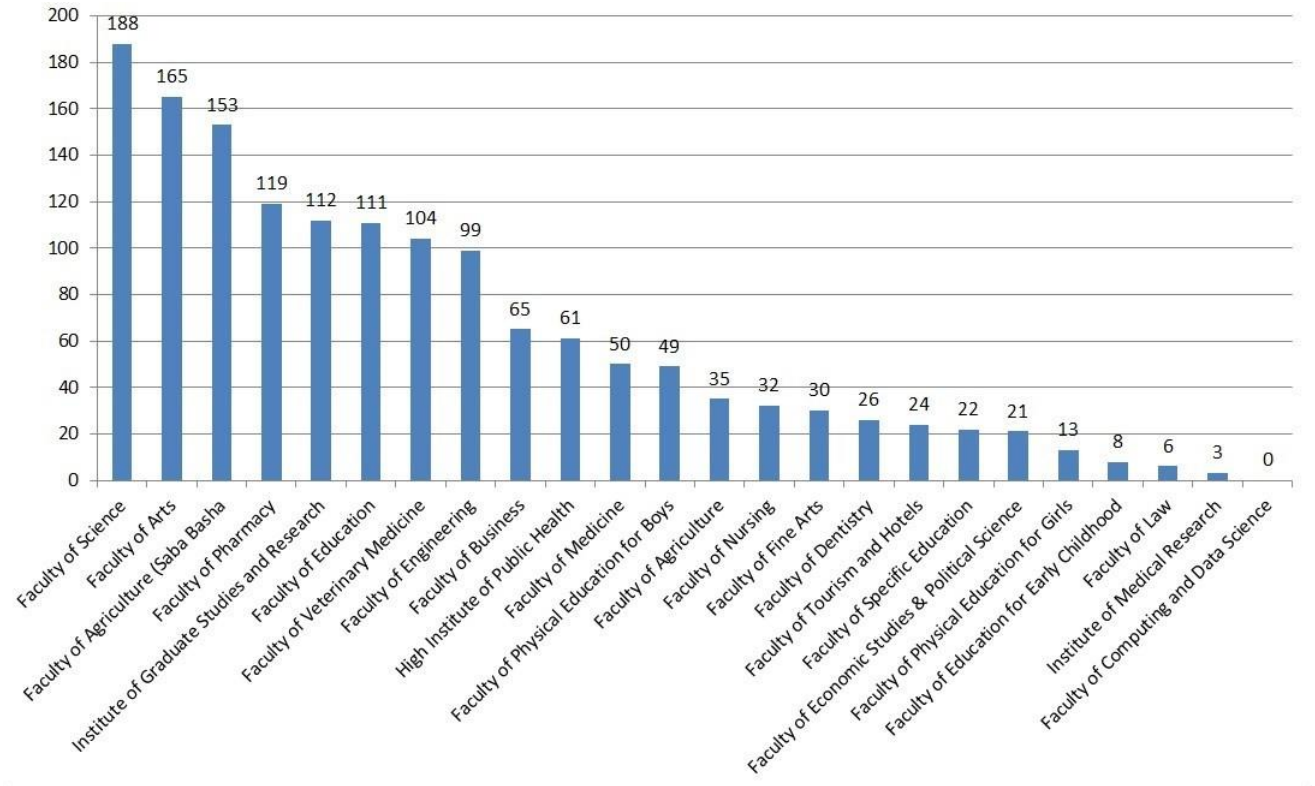
Climate Change Management Numerical Modelling and tools GIS and Remote Sensing Research Methodology and Ethics Climate and Ocean Modelling Climate Smart Agriculture Nanotechnology and Climate Change Sustainable Blue Economy Coral Reefs and Climate Change Energy Efficiency Management in Maritime Industry Environmental Impact Assessment Integrated Coastal Zone Management Climate Change and Biodiversity Global Environmental Governance Strategic Planning and Project Management Quality and Safety Management Systems Climate Change effects on Coastal Dynamics Adaptation Strategies to Climate Change for Hydraulic Risk Prevention in Coastal Areas Climate Change Policy of the EU Adaptation and Mitigation to Climate Change in Spatial Planning Master of WasteWater Engineering Practice Master of Drinking Water Engineering Practice Master of Radiation Physics Practice Master of Petrochemicals and Hydrocarbon Processing Practice M.Eng. Water Recourse M.Eng. in Irrigation Structures M.Eng. in Environmental Engineering M.Eng. in Thermal Engineering M.Eng. in Combustion Engines M.Eng. in Electrical Energy Systems and Control M.Sc./Ph.D in Electrical Engineering (Electrical Power and Machines) Master of Climate Change and Sustainable Development International Master of Smart Environmental Management of Climate Change International Master of Natural Resources Sustainability for Land Development International Master of Sustainable Management of Fisheries and Aquaculture Science Environmental silviculture and tree – resources management Pest control & environment protection from cides pollution. Soil and water sciences Pesticides chemistry and technology Sustainable management of water resources Sustainable management of land resources Occupational Hygiene and Air Pollution Environmental Health Food Hygiene and Control Environmental Health Occupational Hygiene and Air Pollution Food Hygiene and Control Environmental Studies - Biological Science Climatic Change and Sustainable Development Environment and Energy Sustainable Cities Sustainable Communities Soil and Water
Example of Programs and Courses/Subjects Related to Sustainability (Alexandria University, Egypt)

Above is a list of examples of programs and courses which aims to embed sustainability that are offered by the University.The total number of courses related to the environment and sustainability in the various sectors of the university, runningin the academic year 2023 – 2024, according to the data received from the colleges and specified in previous detailed table,**is 1496**, which represents approximately **11.1 percent** of the total number of courses for the undergraduate and graduatelevels, in 25 Faculties and Institutes at the University.

In this context, the table below shows the total number of courses related to the environment and sustainability according to the specializations of the university's various faculties and institutes:

Sectors	Number of courses related to environment and sustainability		Total number of courses Offered during the academic year 2023/2024	Percentage of the number of courses related to environment and sustainability
	Undergraduate studies	postgraduate studies	Undergraduate and postgraduate studies	
Medical sector (dental-pharmacy-nursing-veterinary medicine- - Medical Research Institute)	**136**	**463**		
Basic sciences sector (Engineering - Agriculture - Saba Pasha Agriculture - Science - Fine Arts - Specific Education - Graduate Institute)	**237**	**313**	**13520**	**11.1%**
Humanities sector (Commerce - Arts - Tourism and Hotels - Education - Law - Physical Education for Boys - Physical Education for Girls - Early Childhood Education)	**223**	**124**		
Total numbers	**596**	**900**		

Number of courses in each college that are related to sustainability



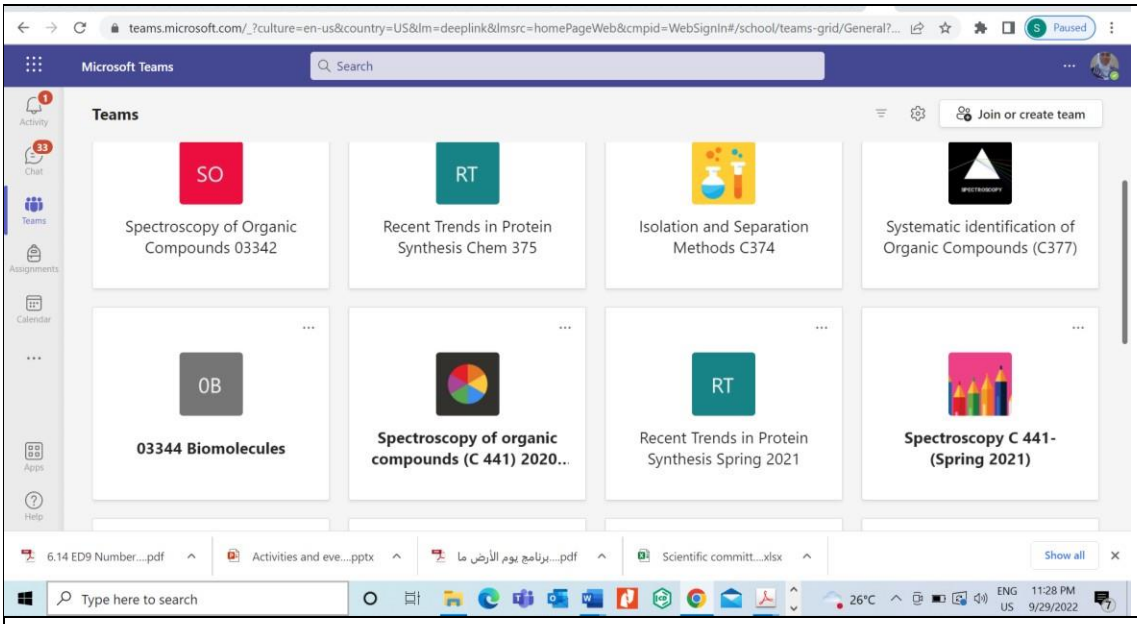
The National Alexandria University was established last academic year (2022/2023) & (2023/2024), with 9 undergraduate Programs (attached is a list of the new programs). The National Alexandria University programs refer to educational programs offered by Alexandria University, which is a public university located in Alexandria, Egypt. However, public universities like Alexandria University do offer programs that are funded by the government, and students pay lower tuitionfees compared to private institutions.

Study begins at Alexandria National University at its headquarters in New Smouha, starting from the academic year 2022/2023 and continuing in the academic year 2023/2024 in nine programs that grant bachelor's degrees, as follows: 1 - College of Medicine - Medicine and Surgery Program.
2 - College of Dentistry - Oral and Dental Medicine and Surgery Program.3 -
College of Pharmacy - Pharm de Clinical Program.
- College of Engineering (Architecture and Construction Program - Computers and Communications Program - Mechatronics and Robotics Engineering Program).
- College of Computer and Data Sciences (Cybersecurity Program - Smart Systems Program).6 -
College of Science - Software and Multimedia Industry Program.

The total number of courses **at the new Alexandria National University** in the academic year 2022/2023 & 2023/2024 are531 courses.

College	Program	Total number of courses
College of Medicine	**Medicine and Surgery Program**	**49**
College of Dentistry	**Oral and Dental Medicine and Surgery Program**	**75**
College of Pharmacy	**Pharm de Clinical Program**	**66**
College of Engineering	**Architecture and Construction Program**	**55**
	Computers and Communications Program	**101**
	Mechatronics and Robotics Engineering Program	**84**
College of Computer and Data Sciences	**Cybersecurity Program - Smart Systems Program**	**48**
College of Science	**Software and Multimedia Industry Program**	**53**

Online Courses



Using Microsoft Teams (Alexandria University, EGYPT)

Education programs of Ecosystems
Bachelor Program Department Of Environmental Sciences
Faculty Of Science - Alexandria University

Envt 101 Introduction of Environmental Sciences

Lec. 2 hrs

This survey course is designed to provide students with a sound foundation in basic principles and unifying concepts of Environmental Sciences, Topic selection is based on major themes of modern environmental sciences: Humans and sustainability, Science and ecological principles, Sustaining biodiversity and natural resources and sustaining environmental quality and human societies, Students will gain an awareness of the importance of earth's systems in sustaining our daily lives, Plus the scientific foundation and tools needed to apply critical thought to contemporary environmental issues.

Envt 102 Practical Concepts in Environmental Sciences

Lec. 2 hrs + Tut. 1 hr + Lab. 3hrs

Practical concepts and problem solving in environmental sciences through demonstrations, Hands- on activities, Structured discussions and problem sets beyond those of traditional lecture and discussion components offered in ENVT-101, Emphasizes experience and critical thinking in the four core areas: Geology, Hydrology, Atmospheric sciences and ecology.

Envt 150 Landscape Ecology

Lec. 1 hr + Lab. 3hrs

History and definition of landscape ecology, Its relationship to other subfields of ecology, Causes of landscape pattern (abiotic, biotic, human land use and disturbance), Data for studying landscapes (GIS, remote sensing), Measuring landscape pattern (spatial statistics, landscape pattern analysis), Landscape disturbance dynamics, Effects of landscape pattern on organisms, Populations, Communities and ecosystem processes; Conservation ecology at the landscape scale.

Envt 201 Environmental Earth Sciences and Energy Resources

Lec. 2 hrs + Lab. 3 hrs

Geologic framework that provides a brief background in Earth system science (an overview of our planetary environment, internal processes, rock deformation, plate tectonics, weathering, streams and flooding, Earth materials (such as minerals, rocks and soils) to determine their potential use as resources or waste disposal sites and their effects on human health, Hazardous geologic processes that covers the broad range of geologic events which are damaging to human interests, Including earthquakes, Volcanic eruptions, Landslides and floods, Using and caring for earth resources, Human impacts on the environment (hydrologic processes of groundwater and surface water to evaluate water resources and water pollution problems), Landscapes for site selection, Land-use planning and environmental impact analysis, Medical geology (effects of chemical elements in the environment, especially trace elements, on the health of humans and animals), This involves the understanding of biologic effects of exposure to these elements, As well as knowledge of their distribution in the geologic environment, Energy utilization, Energy resources development, Availability of alternatives and energy resources management, Conservation and policy are presented. Applicable physical principles related to the economics, Conservation and technology of energy are covered.

Envt 202 Environmental Biology

Lec. 2 hrs + Tut. 1 hr+Lab. 3hrs

This course introduces students to principles and concepts of biology and ecology, It provides a broad understanding of the biology of groups or organisms, Ecological relations and processes on the lands, In the oceans and fresh waters and the air, The impacts of global and local environmental changes, human intervention and effects of pollutants on various ecological units are examined, Students also are introduced to molecular biology, The nature of the genetic code, Metagenesis and carcinogenesis.

Envt 203 Ecosystems

Lec. 1 hr + Tut. 1 hr + Lab. 3hrs

An overview of the general principles of ecosystem, Types, Survey of the different ecosystems, Desert ecosystems, Grassland ecosystems, Freshwater ecosystems, Ocean and coastal ecosystems, Fragile ecosystems and human-dominated ecosystems, Egyptian ecosystems, Nile Delta, Western Desert, Eastern Desert, Dunes, Coastal and marine areas, Coral reefs, Fresh water marches, Salt water marches, Fresh water swamps, Fresh water lakes and mangroves.

Envt 204 Environmental Hydrology

Lec. 1 hr + Lab. 3hrs

A comprehensive survey of water resources considering both quantity and quality, Emphasis is on the standard techniques of sampling and monitoring especially for ground water, The hydraulic characteristics of water-bearing formations are also discussed, Analytical procedures used in field investigations and modeling studies are covered, Hydrology and water resources management The hydrological cycle, Precipitation, Evaporation and evapotranspiration, Infiltration, Storage, Run-off, Ground water, Sediment transport, Water-use (irrigation, industry, domestic, navigation, fisheries, recreation), Sources of water (precipitation, lakes, rivers, groundwater, swamps, re-use, desalination), Conservation of water quality (in irrigation, industry and domestic use), Introduction to optimization and water resources management.

Envt 205 Aquatic Sciences

Lec. 1 hr + Tut. 1 hr + Lab. 3hrs

The physical, Chemical, Geological and biological aspects of sea, Lake and stream environments, The

aquatic environments, General characteristics, Ecological subdivisions of aquatic ecosystems, pelagic and benthic communities, Composition, Biology and ecology of important groups, Biological processes, Primary and secondary productivity, Food webs, Ecological factors, Coastal communities, Benthic and pelagic characteristics, Biodiversity, Susceptibility to varying environmental conditions, Bioaccumulation, Economic importance and management of coastal zone communities, Development of aquatic ecosystems.

Envt 250 Environmental Physics

Lec. 2 hrs

This course is being offered to respond to the growing need for knowledge about the physics behind contemporary environmental problems, The lectures and discussions will concentrate on one of the most pressing global environmental problems of the day, The threat of global warming due to increased greenhouse gases in the earth's atmosphere, We will also examine the problem of ozone depletion in the stratosphere (the ozone hole), Alternative energy sources, Such as solar and wind power and environmental problems associated with nuclear power.

Envt 251 Coastal Zone Management

Lec. 1 hr + Lab. 2 hrs

Challenges in the coastal regime, Special nature of the coast, Pressure and effects by human, Rational for government intervention, Understanding the coastal environment, Definition of the coastal zone, Coastal morphology and landforms, Costal ecosystems and classification of coastal areas, Environmental parameters of the coast, Barrier islands, Estuaries, Coastal marshes, Coral reefs, Rocky shores and bluffs, Coastal processes, Wind, waves, Currents and tides, Hurricanes and extra-tropical storms, Sea level rise, Erosion and accretion, Climate change, Monitoring tools for coastal inventories, Conventional methods, Remote sensing, Aerial photography and satellite monitoring, Pollution issues and toxic contaminants, Oil pollution heavy metals and organic toxants, Coastal development and management issues, Land use pattern and sustainable development, Protection of coastal waters and wetlands, Coastal resources and habitat conversation, Management of coastal regimes, International guidelines law of the sea, Egyptian ccoastal policy, Coastal management programs, Managing constructions, Urban waterfront development, Beach access and land acquisition.

Envt 252 Climate and Meteorology

Lec. 2 hrs + Lab. 1hr

The atmospheric physical processes important to understanding climate, Weather and forecasting for the earth’s surface at a range of spatial and temporal scales, Students will observe, Record, Analyze and discuss meteorological phenomena in terms of fundamental physical theories and natural laws, Such as energy relations, Fluid dynamics, Pptics and feedback loops.

Envt 253 Wetland and Aquatic Ecology

Lec. 1 hr + Lab. 3 hrs

A study of the interaction of physical, Geochemical and biological components of wetland ecosystems, Adaptations of organisms in wetland ecosystems and community interactions are emphasized, Field and laboratory study give students experience in inquiry-based activities involving data collection and analyses used in wetland ecology, Techniques in wetland characterization and delineation are covered.

The physical, Chemical, Geological and biological aspects of sea, Lake and stream environments, The aquatic environments, General characteristics, Ecological subdivisions of aquatic ecosystems, Pelagic and benthic communities, Composition, Biology and ecology of important groups, Biological processes, Primary and secondary productivity, Food webs, Ecological factors, Coastal communities, Benthic and pelagic characteristics, Biodiversity, Susceptibility to varying environmental conditions, Bioaccumulation, Economic importance and management of coastal zone communities, Development of aquatic ecosystems.

Envt 254 Behavioral Ecology

Lec. 2 hrs

Behavioral ecology investigates the actions of animals in reference to their evolution, environment and interactions with other organisms. Behavioral patterns are determined by natural selection acting on genomes functioning under particular ecological conditions. Hence, this course will focus on the animal behavior that is related most directly to survival and reproduction in a natural ecological context. Major topics will include: optimality models, predator-prey interactions, distribution of organisms in space, dominance and aggression, mating systems, sexual selection, communication, and helping behavior. An emphasis is placed on students conducting their own research and learning all aspects of the scientific process through the field of behavioral ecology.

Envt 257 Introduction to Environmental Ethics and Politics

Lec. 2 hrs .

History of ideas on man's place in nature, Evolution of environmentalist movement's ethics in 19th- 20th centuries, Contemporary ideas on environment, Technology and economic growth relationships, Sustainable development, This course will review how the major components of the Egyptian political system, Including institutions, Processes and political values, Relate to environmental policy, The course will also provide an update on environmental policies currently active on the national agenda.

Envt 301 Remote Sensing

Lec. 1 hr + Lab. 3hrs

Theory and application of remote sensing, The electromagnetic spectrum, Earth-energy interactions, Photographic and photogrammetic principles and operation of multispectral sensors, Applications include basic photo interpretation and satellite image analysis for agriculture, Environmental assessment, Forestry, Geology, Rangeland, Urban, Wildlife and others, Advanced principles and applications in remote sensing, Emphasizing digital image processing techniques, Spectral and spatial image enhancement, Advance transformations, Image classification and change detection, Course emphasizes hands-on lab and project work, Interpretation of remotely sensed environmental data such as aerial and satellite photo imagery, Topics include photogrammetric correction, Photo interpretation, Classification of land use cover and features and the use of image analysis software and heads-up digitization.

Envt 302 Geographic Information Systems

Lec. 1 hr + Lab. 3hrs

This course is designed to acquaint students with the history, Operation and applications of geographic information systems (GIS), This course will cover all aspects of GIS including data collection, Preprocessing, Data management and data analysis as well as the application of these systems.

Envt 303 Environmental Microbiology

Lec. 1 hr + Lab. 3hrs

To provide a basic understanding of environmental microbiology primarily from two aspects: Microbial interactions with chemical pollutants in the environment and the fate of microbial pathogens in the environment, Topics covered include microbial environments, Detection of bacteria and their activities in the environment, Microbial biogeochemistry, Bioremediation and water quality.

Envt 304 Conservation and Natural Resources

Lec. 2 hrs + Tut. 2 hrs

Conservation of natural resources including history, Ecological and social foundations, Examines

principles of sustained yield, Carrying capacity, Supply and demand and world population growth as applied to agriculture, Range, Forest, Wildlife, Fisheries, Recreation, Minerals and energy management, The role of genetics and behavior in shaping the patterns and processes of nature, With an emphasis on the critical process of natural selection and general ecology, Including habitat types, Communities, Ecosystems, Population dynamics and trophic interactions, Each topical area will be examined in the context of natural resource applications, Managing protected areas, Conservation and sustainable development at the local and national levels.

Envt 305 Desert and Desertification

Lec. 1 hr + Tut. 2 hrs

Study of desert's types, Features, Biomes and distribution, This course concentrates on improving the understanding of desertification and desert development through studying causes, Impacts, Prehistoric patterns, Historical and current desertification and its mitigation.

Envt 306 Environmental Chemistry

Lec. 3 hrs

Topics related to the sources, Reactions, Transport, Effects and fates of chemical species in water, Soil and air environments, Properties of water and bodies of water in relation to the basic principles of chemistry, Aquatic microbial biochemistry principles, Composition and chemistry of the atmosphere, Particles in the atmosphere and air pollution, Composition and properties of soil in relation to soil pollution, An introduction to "green" chemistry.

Envt 308 Environmental Chemistry (Lab)

Lab. 3 hrs

This course is aimed to provide a general overview for the wastes and pollutants in soil, Nature and sources of hazardous wastes, Environmental chemistry of hazardous wastes, Mass transport in saturated media, Reduction, Treatment and disposal of hazardous wastes.

Physical basis of atmospheric phenomena on small, Medium and large scales, Introduction to atmospheric dynamics, Examination of atmospheric circulation systems, Introduction to atmospheric physics and chemistry, Particles in the atmosphere, Gaseous inorganic air pollutants, Organic air pollutants, The photochemical smog, The endangered global atmosphere, Sources, Fate and effects of air pollution, Air quality, Air quality monitoring, Gas and vapour sampling, Particulate matter sampling, Emission measurements, Air quality monitoring system, Case studies of air quality management, Indoor air pollution, Public and occupational health: Introduction to toxicology as it relates to environmental and health effects of hazardous materials, Toxicological methodology, Risk management factors including microbiological and socio-legal aspects, Risk assessment.

Envt 350 Natural Hazards

Lec. 2 hrs + Tut. 1 hr

This course will introduce the earth system as a basis for characterising and understanding natural hazards, Their causes and consequences, The major types of natural hazard will be described, Analysed and assessed in terms of their underlying causes as well as their socio-economic and environmental impacts, This Course capitalises on natural synergies between subsurface, Surface and human dimensions of the Earth System, Hazards to be considered will include earthquakes and tsunamis, Volcanic hazards (local, regional and global scale), Meteorological hazards (hurricanes, tornados, dust storms, el nino, flooding and coastal erosion), Topographic hazards such as collapse of unstable slopes, Hazards arising from climate change and hazards associated with bolide impacts, The evidence for past natural catastrophes and hazards, Recorded in natural archives, Will be described along with remote sensing methods for documenting current hazards and hazard risk, The principles and application of risk assessment and analysis will be

considered with respect to case studies, The course will conclude with an overview of human settlement, Planning and policy in relation to natural hazards in the light of their socio- economic impacts.

Envt 351 Environmental Hydrogeology

Lec. 1 hr + Lab. 3 hrs

Environmental hydrogeology (the geologic and hydrologic factors controlling the occurrence, movement and chemical quality of groundwater), Topics covered include: Water, Hydrological cycle, Evaporation, Transpiration, Infiltration, Surface water / Groundwater interaction, Stream discharge, Porosity, Specific yield, Specific retention, Darcy's Law, Measuring permeability, Aquifer properties, Storativity, Homogeneity and isotropy, Fresh water head, Equations of groundwater flow, Flow lines, Steady-flow equations, Vadose zone, Unsaturated flow theory, Groundwater flow to wells, Theim equation, Thies method, Jacob method, Hantush method, Neuman method, Theoretical time-drawdown relationship, Slug tests, Hvorslev slug test method, Bouwer and rice method, Specific capacity, Case studies, Regional groundwater flow, High Plains aquifer, Groundwater interaction with regional aquifers lakes and wetlands, Inorganic chemicals in groundwater, Chemical reactions, Isotope hydrology, Sources of groundwater contamination, Sampling in the saturated and vadose zones, Groundwater management, Surficial geophysical methods.

Envt 353 Plant Tissue Culture

Lec. 1 hr

Plant Tissue Culture will cover the essential in vitro methods and strategies currently available in research and commercial production, We will systematically explore each of the technologies in classic plant tissue culture from the basics to high tech applications and combine the lectures with practical laboratory experience whenever possible.

Envt 355 Atmospheric Chemistry

Lec. 1 hr + Lab. 3 hrs

This course treats the earth's atmosphere as a biogeochemical system now significantly perturbed by human activity, After a brief review of needed chemical fundamentals, The course treats the following topics: The structure and general circulation of the atmosphere, Energy balance and the transfer of radiation, With major emphasis on the natural and perturbed photochemistry of the stratosphere and troposphere, Current atmospheric environmental issues (stratospheric ozone loss, greenhouse warming, urban/regional smog) are treated as perturbations of natural biogeochemical cycles (C,N,Cl….), Course concludes with possible policy implications of these atmospheric chemistry problems (e.g. proposed 'geo- engineering' solutions to global climate change).

Envt 356 Environmental Phytoremediation

Lec. 2 hrs

The study of environmental pollution effects on physiological and ecological processes of plants, In both managed and unmanaged ecosystems, Pollutants under study include contaminants of air (such as ozone, Sulphur dioxide and UV-B radiation) and soil (such as metals and organic xenobiotics), Topics include principles, Protocols and applications of molecular biology and biotechnology for genetic improvement of microbes / plants for environmental remediation.

Envt 357 Geomorphology

Lec. 2 hrs .

The course includes discussion of earth-surface processes, analysis of landforms, and quantification of geomorphic data.

Envt 358 Environmental Health and Monitoring

Lec 2 hrs + Tut. 1 hr

This course covers the influence of environmental conditions on human health, Emphasis is placed on environmental contaminants and the major exposure routes of the human body, Upon completion, Students should be able to examine segments of the environment, Including air, Water and food and determine how the conditions of these influence human health.

Envt 359 Land Degradation

Lec. 2 hrs + Tut. 1 hr

The types and causes of land degradation in dryland areas, First-hand experience of field techniques for land degradation assessment, Land degradation within the context of global environmental change issues and major developmental problems, To relate land degradation, Its impact and conservation measures to the Sustainable drylands Livelihoods framework.

Envt 360 Environmental Micropaleontology

Lec. 1 hr + Lab. 3 hrs

Environmental Micropaleontology deals with the use of microfossils in dated sediment cores to interpret environmental change, Whether naturally or human induced, Examples from marine and freshwater systems illustrate how quantitative relationships between microfossil and geochemical data can provide information about biological reference conditions, Even in previously non-monitored areas, The complementary nature of the methods used allows a broad understanding of environmental changes in aquatic environments (e.g., pollution, eutrophication, climatic change).

Envt 361 Marine Geology

Lec. 2 hrs + Tut. 1 hr

The focus of this course will be a survey physical makeup of the ocean floor and processes that control its evolution, Included will be discussions global tectonics, Earth history as revealed by the sea floor sediment record (e.g., paleooceanography) and a survey of environments from the abyssal plain to coastal areas of the ocean.

Envt 362 Environmental Modeling

Lec. 1 hr + Lab. 3 hr

This course will introduce users to many new or advanced modeling techniques for 3D site modeling, A series of lectures and hands-on tutorials will be presented covering the following topics in a progressive fashion: Learn about the new options available in MODFLOW2000, Including the new layer property flow (LPF) and hydrogeologic unit flow (HUF) packages, Learn to import and manage data for transient simulations, Learn how to use the new stochastic modeling module in GMS, Including monte carlo, Latin hypercube and indicator simulation methods, Use the new risk analysis wizard to perform probabilistic threshold concentration and probabilistic capture zone analyses, Use the new transition probability geostatistics model (T-PROGS) now available in GMS, Learn how to generate a FEMWATER simulation, Including a discussion of advanced 3D finite element mesh generation techniques.

Envt 401 Environmental Pollution and Public Health

Lec. 2 hrs

Wastes and pollutants in soil, Nature and sources of hazardous wastes, Environmental chemistry of hazardous wastes, Reduction, Treatment and disposal of hazardous wastes.

Public and occupational health: Introduction to toxicology as it relates to environmental and health effects of hazardous materials, Toxicological methodology, Risk management factors including microbiological and socio-legal aspects, Risk assessment.

Envt 402 Global Environmental Issues and Hazards in Egypt

Lec. 2 hrs + Tut. 2 hrs

This course explores ethical, Ecological and policy dimensions of international environmental issues as atmospheric and water pollution, Global climate change, Care of agricultural lands, Water scarcity, Overharvest of renewable resources, Loss of biodiversity and world population growth, Environmental problems will be related to other social and ethical concerns, Topics may include: Land use practices and reform, Farmland and open space preservation, Soil and water conservation, Reversing land degradation, Rangeland management, Wetlands protection and rehabilitation, Waste management and reduction, Recycling and composting, Air pollution, Global warming and sea level rise and marine wilderness areas.

Envt 403 Environmental Pollution (Lab)

Lab. 3 hrs

Envt 404 Student Colloquium Series

Lec. 1 hr

Annual series of colloquia exploring a broad environmental related topic from a variety of viewpoints.

Envt 405 Environmental Impact Assessment

Lec, 2 hrs

Definition, Scope and field of application of environmental impact assessment (EIA), Methodologies of EIA, Assessment of impacts, National and international legislation of EIA, Discussion of case studies.

Envt 407 Environmental Management and Legislation

Lec. 2 hrs

This course addresses environmental issues faced by industry, Including such topics as waste management, Chemical inventories, Pollution prevention and discharge permitting, Industrial ecology is introduced as an approach to the development of a sustainable industrial society, Including treatment of Life cycle analysis, Design for environment, Environmentally conscious manufacturing and Environmental management system (EMS), Understanding ISO 14000 scope and definitions, EMS requirements and environmental policy, Cost benefit, EMS in Egypt, Regulation and regulatory framework of the environmental and hazardous waste law, Definitions, Policy guidance vs regulations, Role of the states, Municipalities and the EEAA, Compliance issues, Case studies.

Introduction to basic legal concepts: Sources of law, Legal remedies, Common law, Administrative law, Planning acts, Environmental protection acts and environmental assessment acts, Critical review of environmental legal concepts and their social, Economic and environmental effects, Understanding of the legal structures within which Egyptian environmental regulations are applied, Legal obligations, The latest trends in developing environmental legislation, International environmental legislation, Treaties and policies, Philosophy of environmental controls.

Envt 450 Environmental Biotechnology

Lec. 1 hr + Lab. 3 hrs

Biological systems for the production of commercial goods and services: Foods, Drugs, Chemicals, Fuels, Equipment, Diagnostics, Waste treatment, Properties of microbial, Plant and animal cells and of enzymes used in bioprocess applications, Classification and characterization of biological agents and materials, Quantification of metabolism, Biokinetics, Bioenergetics, Elementary aspects of molecular biology, Genetic engineering, Biochemistry, Microbiology, Stoichiometry, Knetics and thermodynamics of microbial processes for the transformation of environmental contaminants, Design of dispersed growth and biofilm based processes, Applications include treatment of municipal and industrial waste waters,

Detoxification of hazardous chemicals and groundwater remediation.

Envt 451 Natural Protected Areas and Wildlife

Lec. 2 hrs + Tut. 1 hr

Almost 75% of the training program is conducted in the field, It provides practical examples of management of the great variety of protected areas and an ample range of exercises to provide participants with the practical concepts, Methods and techniques required to improve management of wildlife and protected areas, The course includes, Types of protected area, Social and environmental benefits of protected areas, Protected area systems, Working with user groups, Managing natural resources, The planning process: Achieving desired resource and social conditions and fostering effective management, Basic concepts of biodiversity conservation and wildlife management: categories of wildlife, Understanding and defending wildlife values, Management by objectives, Planning for national protected area systems and individual wildlife areas and integrated natural resource planning, Conflict resolution and consensus building among all the stakeholders involved in protected areas and their surrounding regions, Management of impacts to soil, Vegetation, Water quality and wildlife, Managing visitors, Developing facilities and infrastructure, Conflict resolution and consensus building among all the stakeholders involved in protected areas and their surrounding regions, Case studies on protected areas network in Egypt.

Envt 452 Remote Sensing and Geographic Information Systems Applications

Lec. 1 hr + Lab. 3 hrs

The course offers practical applications to develop hands-on skills in the use of relevant tools and techniques, The applications are mostly in the fields of: Natural resources, Water resources, Earth resources and urban planning.

Envt 453 Water Resources Management

Lec. 1 hr + Lab. 3 hrs

The course is designed to acquaint students with the history and practice of water resources planning and management, Provide examples of water resources planning protocols employed by various agencies and levels of government, Addresses the role of analytic methods in water resources planning processes, Illustrates the roles of interdisciplinary teamwork, Partnerships and public involvement in planning and management processes, Differentiates the roles of planners and decision makers and presents the elements of integrated water resources planning and management.

Envt 454 Environmental Remediation

Lec. 2 hrs + Tut. 1 hr

The course will focus on the principal remediation legislation In the world and in Egypt and will provide an understanding of all laws governing conduct of remediation including the national requirements under the environment protection laws and acts, and legislation. It will also cover how to select remediation contractors and contractor liability will also be addressed. This course will examine the principles of environmental chemistry which apply to the remediation of contaminated soil and water, Including the properties of soils systems and the factors controlling mass transport, Partitioning, and chemical fate, ENVT, Current and emerging remediation technologies and their limitations in soil and groundwater restoration are reviewed.

Envt 456 Waste Management

Lec. 2 hrs + Tut. 1 hr

Integrated strategies for waste control for both industrial and municipal solid waste to include hazardous and non-hazardous streams, Introduction to both hazardous and non-hazardous waste definitions and an overview of environmental legislation regulating these wastes, A broad range of waste management is discussed and successful case studies analyzed, Primary focus is on waste minimization techniques of source reduction and recycling, A thorough review of waste disposal options such as chemical, Physical and biological treatment, Thermal processes and land disposal round out the waste management strategies discussed, Economic and political considerations influencing integrated waste management, Global waste.

Envt 457 Restoration Ecology

Lec. 2 hrs + Tut. 1 hr

Review and discuss fundamental concepts, Current literature and contemporary topics relating to ecological restoration in natural ecosystems, This includes the theoretical development of restoration ecology and its application, Ecological restoration, The relationship with conservation biology will be explored, The goal is to inform, Exchange views and develop critical thinking skills, Case studies will be developed and examined as a means of exploring alternative objectives, Problems, Limitations, Ecological potentials and restoration strategies.

Envt 458 Contaminant Fate and Transport

Lec. 2 hrs

This course exposes the student to pollution fate and transport mechanisms and theory so that they can better probe, Analyze and solve water resources pollution problems, The course tracks pollutant movement through the vadose zone, Groundwater, Rivers, Lakes, Estuaries, Oceans and the atmosphere to characterize the quality of our water resources. Dissolved and particulate pollutants and exchanges between media, Are considered, Describes the physical controls on chemical advection and diffusion based on a theoretical understanding of pollutant fate and transport. The course considers how the biological and physical properties of the soil, Water and atmospheric media affect pollutant fate, Transport and environmental impact.

Envt 459 Contaminant Hyrogeology

Lec. 1 hr + Lab. 3 hrs

Introduction to contaminant hydrogeology, Including properties of organic and inorganic contaminants, Chemical and physical processes affecting concentration of solutes in the subsurface, Mass transport, Multiphase flow, Contaminant monitoring and site remediation.

Envt 460 Ecological Risk Assessment

Lec. 1 hr

Ecological risk assessment is a process for collecting, Organizing, and analyzing information to estimate the likelihood of undesired effects on nonhuman organisms, Populations, or ecosystems, The primary purpose for conducting such assessments is to provide information needed to make decisions concerning site remediation, The course presents a conceptual approach and specific methods for assessing the ecological risks posed by contaminated sites, We will work through the individual steps for understanding and then apply the concepts to real ecological risk assessment case studies.

Envt 461 Biodiversity

Lec. 2 hrs

This course is an integrated survey of the plant and animal kingdoms which stresses general concepts and economically important species, Particular attention will be paid to special structures and mechanisms evolved by selected representatives of major phyla of plants and animals for solving problems of life in various environments, Ecosystem function of biodiversity in Arid Ecosystems, Biodiversity loss, Causes and consequences, Biodiversity conservation.

Envt 490 Research Project

Lec. 2 hrs