

Departments Faculty

Department
Department of Aquaculture
Department of Fisheries and Aquatic Ecosystem
Department of Fish Processing and Biotechnology

Department of Aquaculture

course code	Course Name	ساعات معتدة	مجموع	ورشة/ مزرعة	معمل	تمارين	محاضرة
0110101	An Introduction to Fish Resource Sciences	0	1	1	0	1	0
0110102	Ichthyology	1	2	1	0	1	0
0110103	Aquatic Invertebrates	1	2	1	0	1	0
0110104	Marine Botany	0	1	1	0	1	0
0110105	Principles of Aquaculture	1	2	1	0	1	0
0110106	Aquaculture Systems	0	1	1	0	1	0
0110107	Mariculture	1	2	1	0	1	0
0110108	Integrated Aquaculture	0	1	1	0	1	0
0110109	Ornamental Fish Production	0	1	1	0	1	0
0110110	Invertebrate Culture	1	2	1	0	1	0
0110111	Nutrition of Aquatic Animals	1	2	1	0	1	0
0110112	Aquatic Larval Feeding	0	1	1	0	1	0
0110113	Aquatic Physiology	1	2	1	0	1	0
0110114	Aquatic Biology	1	2	1	0	1	0
0110115	Aquaculture Hatching and Propagation	0	1	1	0	1	0
0110116	Conservation Biology	0	1	1	0	1	0
0110117	Aquatic Birds and Marine Mammals	0	1	1	0	1	0

Internal Regulations for the Undergraduate Stage, Faculty of Aquatic and Fisheries Sciences - Kafrelsheikh University

0110118	Dangerous and Endangered Marine Species	0	1	1	0	1	0
0110119	Aquaculture Engineering	1	2	1	0	1	0
0110120	Microbiology	1	2	1	0	1	0
0110121	Aquatic and Marine Ecology	1	2	1	0	1	0
0110122	Behavioral Ecology	0	1	1	0	1	0
0110123	Fish Diseases	1	2	1	0	1	0
0110124	Diseases of Aquatic Invertebrates	0	1	1	0	1	0
0110125	Nutritional and Managerial Disorders	0	1	1	0	1	0
0110126	Quarantine & Health Care	1	2	1	0	1	0
0110127	Aquatic Animals Genetics & Breeding	1	2	1	0	1	0
0110128	Fundamentals of Economics	1	2	1	0	1	0
0110129	Environmental Economy	0	0	1	1	1	0
0110130	Economy of Fish Projects	0	1	1	0	1	0
0110131	Principles of Account	0	0	1	1	1	0
0110132	Fish Extension & Planning of Extension Programmes	0	0	1	1	1	0
0110133	Fish Marketing and Commerce	0	1	1	0	1	0
0110134	An introduction to Statistics	0	1	1	0	1	0
0110135	Applied Statistics	1	2	1	0	1	0
0110136	Environmental Extension	0	0	1	1	1	0
0110137	Management Principles I	0	0	1	1	1	0
0110138	2 Management Principles	0	0	1	1	1	0
0110160	Seminar Research and	0	2	1	2	1	1
0110170	Graduation Project	0	2	1	2	1	-
0110190	Field Training 1	1	7	7	1	1	-
0110191	Field Training 2	2	00	00	1	1	-

Department of Fisheries and Aquatic Ecosystem

course code	Course Name	ساعات معمدة	مجموع	ورشة/ مزرعة	معمل	تدريب	محاضرة
0110201	Fisheries Management and Development	1	2	1	0	1	0
0110202	Fishing Methods and Technology	1	2	1	0	1	0
0110203	Fish Assessment and Dynamics	1	2	1	0	1	0
0110204	Fishing Gear Construction and Repair and Drawing Technology	1	2	1	0	1	0
0110205	Construction and Stability of Fishing Vessels	1	2	1	0	1	0
0110206	Fisheries Biology and Stock Assessment	1	2	1	0	1	0
0110207	Remote of Sensing and Geographical Information Systems	1	2	1	0	1	0
0110208	Meteorology	1	2	1	0	1	0
0110209	and Fisheries Fishing Laws	0	0	1	1	1	0
0110210	SCUBA Diving	0	1	1	0	1	0
0110211	Basic Safety & Survival Training	1	2	1	0	1	0
0110212	Physical Chemistry	0	1	1	0	1	0
0110213	Organic Chemistry	0	1	1	0	1	0
0110214	Environmental Chemistry	1	2	1	0	1	0
0110215	Marine Chemistry	1	2	1	0	1	0
0110216	Water & Land Chemistry	1	2	1	0	1	0
0110217	Analytical Chemistry	0	1	1	0	1	0
0110218	Aquatic Ecosystems	1	2	1	0	1	0
0110219	Limnology	0	1	1	0	1	0
0110220	Dynamics of Marine Pollution	1	2	1	0	1	0
0110221	Environmental Evaluation of Fish Projects	0	1	1	0	1	0

Internal Regulations for the Undergraduate Stage, Faculty of Aquatic and Fisheries Sciences - Kafrelsheikh University

0110222	Fish Adaptation & Climatic Changes	0	1	1	0	1	0
0110223	Marine Geology and Geophysics	0	1	1	0	1	0
0110224	Oceanography	1	2	1	0	1	0
0110225	Hydrography and Tides	0	1	1	0	1	0
0110226	Oceanography and Coastal Geomorphology	1	2	1	0	1	0
0110227	Integrated Coastal Zone Management	1	2	1	0	1	0
0110228	Natural Protected Areas	0	1	1	0	1	0
0110229	Policy and Law	0	0	1	1	1	0
0110230	Marine Resources Assessment	0	1	1	0	1	0
0110231	Database and Computer Spreadsheet Applications	0	1	1	0	1	0
0110232	Statistical Computer Programmes	0	1	1	0	1	0
0110233	Programmes of Fisheries & Assessment Population Dynamics	0	1	1	0	1	0
0110234	Scientific Writing Skills	0	1	1	0	1	0
0110235	Resolution Conflict Skills	0	1	1	0	1	0
0110260	Research and Seminar	0	2	1	2	1	1
0110270	Graduation Project	0	2	1	2	1	-

0110290	Field Training 1	1	7	7	1	1	-
0110291	Field Training 2	3	03	03	1	1	-

Department of Fish Processing and Biotechnology

course code	Course Name	ساعات معمدة	مجموع	ورشة/ مزرعة	معمل	تأريخ	محاضرة
0110301	Biochemistry	1	2	1	0	1	0
0110302	Introduction to Food Science & Technology	1	2	1	0	1	0
0110303	& Food Chemistry Analysis	1	2	1	0	1	0
0110304	Food Microbiology	1	2	1	0	1	0
0110305	Food Safety Enhancement Program/Hazard Analysis Critical Control Point	1	2	1	0	1	0
0110306	Food Inspection Techniques	1	2	1	0	1	0
0110307	Borne -Food Diseases/Toxicology	1	2	1	0	1	0
0110308	General Physics	1	2	1	0	1	0
0110309	Food Engineering	1	2	1	0	1	0
0110310	Technology of Processing Canning & Wrapping of Sea Food	1	2	1	0	1	0
0110311	Feed Manufacturing Technology	1	2	1	0	1	0
0110312	Water and Wastewater Microbiological Analysis	1	2	1	0	1	0
0110313	Water and Wastewater Treatment	1	2	1	0	1	0
0110314	Molecular and Cell Biology	0	1	1	0	1	0
0110315	Food Biotechnology	1	2	1	0	1	0
0110316	Marine Biotechnology	1	2	1	0	1	0
0110317	Nanotechnology and its applications	0	1	1	0	1	0
0110360	Research and Seminar	0	2	1	2	1	1
0110370	Graduation Project	0	2	1	2	1	-
0110390	Field Training 1	1	7	7	1	1	-
0110391	Field Training 2	3	03	03	1	1	-

Courses Specification

An introduction of fish resource sciences

History of fish resources- fisheries sciences related to fisheries- fish production in Egypt and worldwide- natural water resources (lakes, rivers, seas and oceans)- importance of fish resources- fisheries methods-aquaculture- improvement of fish production- new aquaculture technologies.

Ichthyology

This course covers firstly the form and function, taxonomy, identification, and classification with an emphasis on middle-east fishes. Then, it includes feeding mechanics, locomotion, sensory systems, freshwater and marine habitats, speciation, reproductive strategies, biogeography, and conservation. Labs emphasize taxonomy, classification, and morphological variation

Aquatic Invertebrates

Taxonomy and morphology of aquatic invertebrates (fresh water and marine)- movement- nutrition- - their relationships with other aquatic animals and their adaptation in the environment

Marine Botany

Life history, classification, and ecology of micro- and macroscopic marine plants, including phytoplankton, seaweed, and salt marsh plants, and the interactions between humans and marine plant communities - Survey of phytoplankton, periphyton and flowering plants in local marine and freshwater habitats - Collection, Identification, systematics, and evolution - effect of water movement and quality on the algae and plankton populations- species suitable for cultivation and feeding of fish and crustaceans. Physiology and biochemistry of marine and freshwater algae including: nutrition, metabolic pathways, reproductive physiology, storage and extracellular products, cell inclusions, growth and development.

Principles of Aquaculture

Aquaculture systems: Open systems (off-shore and near-shore)- Semi-closed systems- Closed systems (on shore)- Common culture method for each fish category- Hanging Culture: Raft and suspended trays- Long-line culture- Vertical or rack culture- Bottom culture: Bottom sowing and cultch

lines- Semi-enclosed: flow through tanks- Closed Systems (CAS): Recirculating, raceways, and inland ponds- fish transport- fish care.

Aquaculture Systems

Fish farming techniques (open, intensive and semi-intensive) - technique selection-Production pond design and management- Intensive recirculating aquaculture systems-Intensive production techniques- water filtration (mechanical and bio-filters)- Aquaculture facility management and evaluation- continuous aquaculture

Mariculture

Purposes of mariculture- site selection- water quality and sources- culture systems - Cage culture- Cage design: Floating flexible, floating rigid, semi-submersible and submersible- fish species suitable for aquaculture- induction of spawning and larval keeping.

Integrated Aquaculture

Definition and economic importance of integrated aquaculture- models of integrated aquaculture (with aquatic birds, farm animals)- fish polyculture- examples of integrated aquaculture worldwide- new technologies in integrated aquaculture.

Ornamental Fish Production

Ornamental fish (common species-country of origin- keeping-breeding and hatching in small scales- larval feeding).

Invertebrate Culture

Species of crustacean and shellfish used in aquaculture - farm site and its characteristics - water requirement- feeding, breeding and larval feeding- technologies used in invertebrate aquaculture- harvesting and farm assessment

Nutrition of Aquatic Animals

Introduction in fish nutrition in nature-Nutrients required and used in fresh water, and marine fish and crustacean species for growth and reproduction- basic physiology and biochemistry of the nutrients and applications of these principles to scientific and practical diet formulations and to manufacturing techniques for major species used worldwide in aquaculture.

Aquatic larval feeding

A complete larval life cycle -factors that affect larval quality, focusing on aspects such as bioenergetics, fish larvae ability to digest food and to cope with developmental and nutritional requirements- importance of live food for marine fish larvae and the most up-to-date knowledge on microdiets formulations- the occurrence of malformations- production of microalgae, zooplankton, rotifers, artemia- artificial diets and how to increase their nutritional value.

Aquatic Physiology

Introduction to aquatic life- osmoregulation- circulatory system and blood- respiration- energy and metabolism- digestion- sensation- nervous system- reproduction- immunity- excretion- anatomy and function of skin and gills- gas bladder- endocrine system and hormones.

Aquatic Biology

Classification of aquatic organisms into groups according to their environment: into fresh water, brackish, and marine organisms. Characteristics of each environment and its effect on the existence of the organisms live in, with major examples as rivers, lakes, estuaries, sea .etc. and the conditions needed for their existence and spread, with special emphasis on the most suitable species could be used for economic exploitation in the Egyptian environment- Major emphasis on the approaches (e.g., analysis of energy flow and predator-prey interactions) used to analyze marine communities as well as the sampling techniques employed for each approach and the characteristic habitat type- General knowledge of threatened and endangered aquatic species.

Aquaculture hatching and propagation

Spawning season- factors affecting of maturation of gametes and vitellogenesis- hormones controlling reproduction- environment and reproduction- spawning behaviour- induction of spawning- hypophysation- gamete collection- gamete quality- application of fertilization- egg incubation- hatching- gamete preservation and cryopreservation.

Conservation Biology

Critical and quantitative investigation of current issues in the conservation of biological systems. Issues addressed include habitat restoration, nonindigenous species, harvest strategies, conserving genetic diversity, population viability analysis, global climate change, endangered species recovery, habitat fragmentation, and reserve design. Case studies include examples drawn from terrestrial, aquatic, and marine systems.

Aquatic Birds and Marine Mammals

Seabirds and mammals in marine environment- Structure- Systematics and Distribution- Colonial Breeding -Seabird Demography and Its Relationship with the Marine Environment - Climate and Weather Effects - Breeding Biology- Life Histories–Environment interactions - Site and Mate Choice: An Evolutionary Approach- Communication and Displays- Growth and Development- Effects of Chemicals and Pollution on Seabirds and mammals- Interactions between Fisheries and Seabirds and marine mammals- Biological Conservation

Dangerous and Endangered Marine Species

Ecology and distribution of dangerous marine species- Behavior and attack strategy- Dangerous corals- Dangerous marine invertebrates- Dangerous marine reptiles- Dangerous shark and rays- Dangerous marine fishes- Dangerous marine mammals- Dangerous mollusca. Medical treatment. Definitions-IUCN Red List of threatened species- Categories of threatened species- Reasons for species to be endangered- Habitat loss- unsustainable fisheries- The endangered species act- Scientific research- The International Legal Regime for Protecting Marine Species and Habitat and Ecological Function- Protected Species- The Global Protected Species Conventions- Convention on Migratory Species (CMS)- The Regional Protected Species Conventions- Assessing the threats of marine populations.

Aquaculture Engineering

This course is designed to provide an understanding of engineering principles as they apply to aquaculture technology. Properties of Water- Water Supply- Mechanics of Fluids- Water Level and Flow Measurement- Pumps- Tank Systems- Pond Systems- Effluent and Filtration- Recirculation Systems- Disinfection- Aeration- Degassing- Heating and Cooling- Cage Systems.

Microbiology

Introduction to Microbiology- Microscopy and Staining- Prokaryotic Microorganisms; Eukaryotic Microorganisms- Viruses- Microbial Growth- Control of Microbial Growth- Marine Environment and Microorganisms- Microbial Ecology of the Oceans- Marine Microbes and Human Society- Drinking Water and Wastewater Treatment

Aquatic and Marine Ecology

This is a second level course designed to cover in moderate detail various aspects of aquatic ecology with emphasis on marine ecology. A strong emphasis will be placed on the laboratory sessions which will introduce students to the kinds of data collected during ecological studies in aquatic environments. Ecology and Ecosystems; Primary Production and the Food Chain; Principles, models, and

methods for analysis of dynamics of fish populations and communities; Ecological Cycles; Aquaculture Ecology; analysis of current research emphasizing theory and its potential uses in fisheries management.

Behavioral Ecology

Behavioral adaptations of animals to their environment, including the evolution of behavior and behavioral genetics; foraging and competition for resources; reproductive ecology, mating systems and parental care; and the evolution of cooperative behavior. Examples include both vertebrates and invertebrates

Fish Diseases

Diseases affecting fresh-water and marine fishes (bacterial, viral, parasitic and fungal diseases)- disease identification and diagnosis- disease epidemiology- methods of disease transmission between farms and hatcheries- prevention and control of fish diseases.

Diseases of Aquatic Invertebrates

Diseases of invertebrates such as crustacea, mollusks, and lower phyla- critical information on viral, fungal, bacterial, parasitic, and neoplastic diseases of invertebrates, especially species used in aquaculture, disease identification and diagnosis- disease epidemiology- prevention and control of fish diseases.

Nutritional and Managemental Disorders

Essential nutritional requirements for fish and crustaceans- Nutritional disorders in cultured fish: amino acids, fatty acids, mineral and vitamins– Nutritional disorders in larvae and fingerlings- Managemental disorders: water quality and fish, ammonia, oxygen, water osmolality, pH and water pollution

Quarantine& Health Care

Quarantine programs form part of a first line of defense against possible adverse effects resulting from the introduction or transfer of exotic fish and shellfish. As such, they must be developed within the context of larger national and international plans addressing this problem. “Codes of Practice” for the introduction and transfer of aquatic organisms which have been developed by international organizations provide a starting point for designing national fish health legislation and international agreements to prevent the spread of disease. To succeed, such efforts must be accompanied by the development of regionally agreed-upon lists of certifiable pathogens, the

standardization of diagnostics techniques and the production of health certificates of unambiguous meaning. Strong commitment by national governments and the cooperation of importers/exporters are considered key elements in the success of these programs. Successful disease prevention will also be directly related to the ability of countries to reduce their dependence on imported brood stock and fry for the aquaculture industry, and shipments for the ornamental fish trade, particularly those involving wild-caught fishes. Disease transmission between fish farms and hatcheries- methods of prevention of such spreading – control of aquatic diseases- disinfection and sanitation- Biological methods to control the diseases (bio-filtration-increase water flow-chemicals and natural products which has no effect on the environment and human health).

Aquatic Animals Genetics & Breeding

Selective breeding; basic principles of relatedness and genetic variation in predicting the inbreeding and genetic improvement; organization and recording of pedigree and phenotypes; important traits included in a breeding program; inbreeding and genetic gain; potential use of biotechnological and genomic tools in fish breeding

Descriptive Statistics

This course is designed to provide the student with a working knowledge of descriptive statistics and the statistical treatment and interpretation of data. Sampling- Methods for Describing Sets of Data- Probability and Binomial Distribution- Normal Distribution- Inferences Based on a Single Sample: Estimation- Statistical Inference: Tests of Hypothesis- Analysis of Variance: Simple Linear Regression- Data Collection and Surveys- Statistical Inference

Applied Statistics

This course is designed to familiarize students with modern statistical methods and guidelines for the analysis of food safety/ production data and to provide an introduction to statistical process control methods. Introduction- Numerical Methods for Describing Sets of Data- Normal Distributions- Inferences Based on a Single Sample: Point Estimation- Statistical Inference: Tests of Hypotheses- Analysis of Variance- Regression and Correlation- Discrete Probability Distributions- Acceptance Sampling- Statistical Process Control.

Environmental Extension

Environmental framework(ecosystems) - Environmental affairs agencies- Environment and Health- The role of information and communication in environmental and human health protection- Public awareness- Media communications- Environmental database- Rationalize water usage through guidance programmes- Increasing environmental awareness to increased and protect environmental usage.

Management Principles I

This course is designed to give participants an understanding of the current business management principles and practices applicable to Egyptian industry in general. This course will teach participants to develop organizational decision-making and planning skills and assist them to function as a team player in the modern workplace. Business and Economic Systems- The Egyptian Business System- Small Business and Entrepreneurship- The Business Functions; Improving Productivity- Practicing Interpersonal Skills- Leadership Skills- Problem-Solving - Making Decisions and Taking Action- Contemporary Management Issues.

Management Principles II

This course is designed to give participants of the current management principles and practices applicable to the industry. This course will concentrate on teaching participants how to develop organizational and planning skills and how to function as a team player. The Evolution of Management Thought- Contemporary Management Issues- Management Practices- Practicing Interpersonal Skills- Leadership Skills- Problem Solving- Improving Productivity- Making Decisions and Taking Action- Adapting to Change- Total Quality Management.

Fisheries Management and development

Introduction in the fishing methods and harvesting techniques, impacts of fishing on the resource and the water environment and future trends in fisheries management and development. Introduction and Harvesting Overview (Fishing Methods, Fish Biology and Behaviour, Fishing Gear Technology, Scientific Methodology and Harvesting, Allocations and Regulations, Future Trends).

Fishing Methods and technology

Introduction in fisheries development- fishing methods- fishing nets- fishing strategies- Vessels and fishing gear- modern technologies in fishing: Sounders and sonar, Satellites and remote sensing.

Fishing Gear Construction, Repair and Drawing Technology

This course introduces participants to fishing gear construction and repair. Introduction to Trawls- Basic Net Making Knowledge- Basic Net Repair- Application of Conservation Technologies- Mobile Gear Construction and Repair Techniques- Trawl Operations and Further Equipment- Net Making for Fixed Gears- Principles and Uses of Rope and Wire.

Construction and Stability for Fishing Vessels

Fishing vessel construction and stability are important, interconnected areas of study to ensure the safe operation and handling of fishing vessels. It is essential that vessel operators have a good understanding of the relationships that exist between the vessels shape, builder's plans and how a completed hull operates in a marine environment. This course is specifically directed towards fishing vessel operators and deals with the basic theory and application of construction and stability as it applies to fishing vessels in various conditions of load. Basic Ship Measurement and Design Terminology- Hull Shapes and Structural Terminology- Vessel Seaworthiness and Regulatory Requirements- Essential Vessel Systems and Inspection Protocol- Basic Ship Stability Terminology- Basic Transverse Stability Principles- Interpreting Righting Lever Curves- Basic Longitudinal Stability Principles- Principles of Free Surface Effect- Freeboard and Reserve Buoyancy- Anti Roll Devices and Vessel Stability- Vessel Modifications and Its Effect on Stability- Interpreting Stability Booklet Data- Effect of Fishing Operations on Vessel Stability- Environmental Effects on Stability - The Dynamics.

Fisheries Biology and stock assessment

Introduction to the theory of fish population dynamics with emphasis on techniques used to assess the biological characteristics of exploited fish populations, and the use of such information for fisheries management. Sampling methods: Age, growth, natural and fishing mortality- maturation and recruitment concepts with mathematical tools for describing these processes- Classical fisheries stock assessment models- Both age based and length based approaches to individual models- Effects of ecological factors together with fishery impact on biology, age at maturation, survival, growth and demography of populations.

Remote of Sensing and Geographical Information System

Windows® Operating System Environment- Electronic Navigational Chart: Definitions, Concepts and Related Authorities- Legal Aspects and Requirements for Fishing Vessels- Sensors and Interfaces- Electronic Chart Data- Navigating with the Electronic Charting System- Passage Planning with the Electronic Chart- Executing and Monitoring the Passage Plan- System Status Alarms and Indicators- Risk of Over-reliance - Fishing Data Management- Back-up Arrangements- Collision Avoidance Information Management- Bottom Mapping- Communications.

Meteorology

This course provides an introduction to fundamental meteorological theory and links the concepts to shipboard practice. Instruments- The Atmosphere- Pressure- Temperature- Water Vapour- Clouds- Precipitation- Visibility and Fog- Wind- Temperate and Polar Zone Circulation- Tropical and Subtropical Circulation- Organization and Operation of Meteorological Services- Forecasting

SCUBA Diving

Full semester in the fundamentals of scuba diving, through a progressive series of classroom lectures and pool sessions, the students will gain the knowledge and skill necessary to conduct themselves with competence underwater. A high emphasis is placed on safety and problem prevention. Topics covered are: navigation, search and recovery, low visibility/night diving, surface supplied diving, boat diving, accident management hyperbaric medicine, physiology and scientific research methods for divers. Strong swimming ability is required.

Basic Safety & Survival Training

This is a basic safety training course for seafarers which meets IMO: STCW Regulation VI/ 1 and STCW Code Tables A-VI/ 1-1, 1-2, and 1-4, and requirements under TP 4957 in Marine Personnel Regulations in Basic Safety and in Marine Fire Fighting. Introduction and Course Safety, Hazards, Emergencies, Emergency Preparedness and Response- Pollution Prevention- Fire Fighting Theory- Fire Prevention and Control Aboard Ships- Shipboard Fire Fighting Organization and Training- Practical Fire Fighting- Use and Care of Fire Fighting Equipment- Lifesaving Equipment and Abandoning- Survival- Communications- Rescue- Safe Working Practices- Effective Human Relations on Board Ships. This course is designed to provide personnel with an understanding of the hazards associated with working in an offshore environment, the knowledge and skills necessary to react effectively to offshore emergencies and to care for themselves and others in a survival situation. Hazards- Emergencies and Safety- Emergency Preparedness and Response- Firefighting- Personnel Buoyancy Apparatus- Personal Transfer Devices- Evacuation- Survival Craft and Launching Systems- Survival- Signaling Devices- Search and Rescue- Helicopter Safety and Emergency Procedures.

Physical Chemistry

States of Matter and Properties of Gases- Thermodynamics: The First Law- Thermodynamics: The Second Law- Phase Equilibria- Properties of Mixtures- Chemical Equilibria- Kinetics- Electronic structure.

Organic Chemistry

This is an intermediate level chemistry course designed to provide the student with the basics of organic chemistry. Introduction to Organic Chemistry- Bonding and Isomerism- Alkanes and Cycloalkanes: Conformational and Geometric Isomerism- Alkenes and Alkynes- Aromatic Compounds- Stereoisomerism- Alcohols, Phenols, and Thiols- Ethers- Aldehydes and Ketones- Carboxylic Acids and Their Derivatives- Amines and Related Nitrogen Structures

Environmental Chemistry

This course is designed to provide students with the basic skills required to perform chemical analysis on environmental samples. The course will build upon knowledge obtained in general chemistry with applications to the environmental industry. Basic Environmental Chemistry; Chemistry of Surface and Subsurface Waters; Characteristics of Seawater; Water and Wastewater Treatment; Organic Toxins and Contaminants. Water and Wastewater Treatment; Organic Toxins and Contaminants; Toxicology and Epidemiology; Biotic and Abiotic Chemical Transformations

Marine Chemistry

Marine chemistry is the study of the chemical composition, distribution, and transformation of matter in the sea. It is a very broad field ranging from the inorganic chemistry of dissolved molecules to the chemistry of particulate organic material of biological origin. Water composition- Effect of temperature and pressure on sea water composition- Minerals at the sea waters- Nutrients cycles in the seas and oceans- Iodine cycle- Minor and major mineral constituents of the sea- Chlorophyll and primary productivity at the sea.

Water & Land Chemistry

This course is designed to give the student an understanding of the chemical composition of natural waters and the analytical methods by which these constituents are to be determined. Criteria and Standards for Drinking Water Quality- Sampling- Quality Assurance/Quality Control- Concentration of Solutions- Characteristics of Natural Waters; Organic Compounds in Raw and Finished Waters; Disinfection Chemistry.

Analytical Chemistry

This is an advanced level course designed to provide the student with a detailed understanding of the instruments and techniques involved in water analysis. Introduction to Analytical Chemistry- Quality Assurance in Analytical Chemistry- Electroanalytical Techniques- Separation Methods- Quantitative Optical Spectroscopic Methods- Mass Spectroscopy.

Aquatic Ecosystems

This course explores the biological, chemical and physical features of fresh, brackish and marine water. These features are related to general ecological concepts and environmental concerns. The course

focuses on the invertebrate and fish communities, and the physiological adaptations of species to the aquatic environment. Theoretical approaches and practical techniques will be addressed. The laboratory introduces you to a variety of aquatic ecosystems and species and relevant sampling procedures and equipment.

Limnology

National and international water systems – National fisheries – Egyptian lacks and their production – Problems in Egyptians fisheries – How to solve these problems and to increase the fisheries productivity.

Dynamics of Marine Pollution

This is an introductory course of the mechanisms involved in the movement of pollutants in the marine environment. This includes oil and chemical spills and also the spread of pollution from land based sources. Properties- Priority Pollutants- Spill Behaviour in the Marine Environment- Environmental Factors- Introduction to Pollution Response- Effluent Plume Dispersion- Limnology- Open Channel Flow- Offshore Exploration and Production (Oil and Gas) - Control of water pollution (Domestic sewage, Industrial wastewater, Agricultural wastewater, Urban runoff “stormwater”)- - Environmental management- Regulation and monitoring of pollution- Pollution prevention- Waste management- Waste minimization.

Environmental Evaluation of Fish Projects

Setting the ground for environmental assessment- How the assessment is being developed- Information sources- Data status- Main steps of data processing (methodology)- Consultation for the assessment- Assessment of trends related to environment- Status of spatial assessment work- Land cover changes in the coastal zone- State of natural resources on the coast- Coastal water pollution.

Fish Adaptation & Climatic Changes

Green house effect- Chloroflorocarbons and Ozone- Other gases cause global warming- Factors affect the global warming phenomena- Effects of climate change on marine ecosystems- Responses of rocky shore communities to recent climate change- Changes in depth distribution and biomass as a result of climate change.

Marine Geology and Geophysics

This course provides the student with an introduction to the fundamentals of marine geology and geophysics. Emphasis will be placed on the geological and geophysical processes that shape the ocean basins and continental margins including the means to acquire, analyze, interpret and disseminate the data. An Introduction to Geology- Marine Geology- Marine Geophysics- Geotechnical Capabilities.

Oceanography

Introduction to Oceanography- Physical Properties of the Ocean- Chemical Properties of the Ocean- Biological Properties of the Ocean- Coastal Processes- Atmospheric Effects- Currents- Waves- Tides

Hydrography and Tides

This course is designed to provide students with an understanding of hydrographic survey specifications and planning with respect to tide and water levels. It will introduce students to the principles and characteristics of tidal influence in hydrographic surveys. Also, the course will provide students with practical operation of instruments used for sea level measurement. Introduction to Hydrography- Tides and Water Levels- Water Level Flow and Tidal Currents- Vertical Datums- Harmonic Analysis and Tide Prediction- Instruments for the Measurement of Sea Level.

Coastal Oceanography and Geomorphology

This is an introductory course on General Oceanography and Geomorphology designed to provide the participants with an integral view of the physical-chemical, biological and geological components of the ocean and its interaction with the continent in the structuring of the coastal zones. It will also review the interactions of ocean-atmosphere in the generation of climate. Introduction to Geomorphology- Coastal Geomorphology- Coastal Erosion and Deposition- Land and Sea Level Changes- Coastal Dunes- Coral Reefs- Physical, Chemical Oceanography- Biological Oceanography- Ocean Dynamics- Ocean-Atmosphere Interaction- Oceanographic Data Collection and Analysis- Geological Structure of the Continents and Oceans- Erosional and Depositional Shores- Man made Alterations of the Coastline- Climate and Weather- Atmospheric and Ocean Circulation- Tropical Storms and Hurricanes- Ocean Waves- Tides.

Integrated Coastal Zone Management

This course will introduce participants to the concept of Coastal Ecosystem, Natural Resource, Ecological balance and Ecosystem dynamics. It describes the various types of coastal ecosystems and its main components. The main objective will be to provide participants with a multi-sectoral perspective of the different types of resources available in the coastal zones. Basic Ecological Principles- Classification of Marine Environments- Adaptive Strategies of Intertidal Organisms- Diversity of the Intertidal Zone-

Concept of Marine Resources- Living Resources- Mineral and Energetic Resources- Coastal Space as Resource- Resource Valuation and Decision Making - Elements of Coastal Resources Management- Historical Overview of Managing Coastal Resources- Protecting the Coastal Environment- Development and Coastal Resources Management- Coastal Management Use and Issues- Legal Aspect of Managing Coastal Resources- Sustainability Tenets- Concepts of Coastal Planning and Management; Management Fundamentals- Interdisciplinary Tools for Resolving Coastal Conflicts- Managing Coastal Resources.

Natural Protected Areas

How does protected area established?- Definition and categories- Relationship between the categories- Selecting the sites for MPAs (Management of Protected Areas)- Planning and managing MPAs- Planning for financial sustainability- Translating MPA objectives into design criteria- Role of science in MPA- Evaluating the Effectiveness of Marine Protected Areas- Governance of protected areas- Applying the categories- Specialized applications- International conservation initiatives- Guidelines for applying protected area management categories.

Policy and Law

This is an introductory course that looks at various aspects of marine environmental law at the regional, national and international level. It gives the students an overview of various location, the regulatory bodies that deals with them and the interaction between these various bodies. The Policy Making Process and the Development of Laws and Regulations- International Environmental Initiatives- International Environmental Conventions- National Environmental Acts- Laws and Regulations- Local Laws- Acts and Regulations- Municipal Regulations- Environmental Legal Issues. Emergency Procedures.

Computer Database and Spreadsheet applications

This course will advance the concept of the computer as a personal productivity tool. Emphasis will be placed on the analysis of spreadsheet data and graphs, understanding of database functions and the integration of software packages with reference to relevant studies. Computer Fundamentals- Presentation and Word-processing Software Applications- Intermediate and Advanced Spreadsheet Software Applications- Database Software Applications- Software Integration.

Programs of Fisheries Assessment & Population Dynamics

Study the modern computer programs specific for fisheries and stock assessments such as: Fish Stat Plus, Length Frequency Distribution Analysis (LFDA), Length Based Fish Stock Assessment, Catch Effort Data Analysis (CEDA), Yield, ParFish and EnhanceFish.

Scientific Writing Skills

This course is designed to help technology students apply criteria for structuring informal and formal reports. Various report formats will be examined with emphasis on research, organization, and documentation. Oral reporting techniques will be enhanced through formal technical report and persuasive presentations. The Strategy of Technical Reporting; Informal Report Writing- Formal Report Writing- Technical Presentations- Technical Correspondence.

Conflict Resolution Skills

This course provides participants with an understanding of the basic principles of conflict Resolution and negotiation strategies. The skills taught will enable students to accept a role in the coordination of multidisciplinary groups, investigate and solve problems, generate solutions to inter-sectoral conflicts relevant to the coastal zones. Introduction to Conflict Resolution- Elements of Effective Leadership- Organizational Behavior- Decision Making and Problem Solving- The Nature of Negotiations- Egyptian Labour Practices.

Introduction to Food Science & Technology

An introductory course that describes the fields of food science and food technology including introductions to nutrition, food chemistry, microbiology, and food processing. Selected aspects of marketing and product development will also be introduced. Size, scope, functions and contemporary problems of the food industry will be discussed. The laboratory component will involve a study of common methods of food processing/preservation. Food Science and Technology- Characteristics of the Food Industry- Food Constituents- Nutrition- Food Changes: Causes and Control- Food Processing- Marketing and Product Development-Speciality Foods- Issues.

Food Chemistry & Analysis

This is an advanced level course designed to provide the student with an understanding of the various aspects of food chemistry. Introduction to Food Chemistry- Water- Carbohydrates- Lipids- Amino Acids, Peptides, and Proteins- Vitamins and Minerals- Food Additives- Toxic Substances- Pigments and Colourants- Reporting Results and Reliability of Analysis- Instrumentation- Naturally Occurring Food Components- Chemical Additives; Indirect Additives, Residues and Contaminants-Naturally Occurring

Toxicants. This course is designed to provide the student with a detailed understanding of food analysis and how it relates to food chemistry and food technology. Introduction to Food Analysis- Spectroscopy- Chromatography- Electrophoresis.

Food Microbiology

This course will introduce students to the microorganisms and their activities in food production. Introduction to Food Microbiology- Characteristics of Microorganisms Associated with Foods- Food Spoilage- Food Preservation Methods- Food Borne Diseases- Microbiological Analysis of Foods- Detection of Microorganisms in Food Environment- Predictive Microbiology- Microbiological Criteria- Microbial Growth and Nutrition- Microbial Analysis of Foods- Factors Influencing Microbial Growth in Foods- Microbial Safety of Foods

Food Safety Enhancement Program/Hazard Analysis Critical Control Point

This course provides participants with an understanding of the concepts, principles, terminology, and skills required for the development, implementation, maintenance, validation and reassessment, and auditing of the FSEP/HACCP system within food processing establishments. Introduction to HACCP and FSEP- FSEP Prerequisite Programs- Development of a HACCP Plan- Hazard Analysis- Critical Control Point Determination- Validation and Reassessment of the HACCP Plan- Audit Principles. It also provides students with a detailed information concerning sanitation and good hygiene practices. The course will enable students to set policies and design cost-effective programs. Introduction- Regulations and Buyer Drive Programs Affecting Food Sanitation- Microbiology- The Control of Microorganisms- Cleaning and Sanitization Practices- Pest Control- Industry Specific Sanitation Considerations- Elements of an Effective Sanitation Program- Facility Design, Maintenance and construction- Food Plant Design and Equipment Design- Sanitation of Incoming Materials- Water Sanitation- Waste Treatment- Food Regulations.

Food Inspection Techniques

This course is designed to provide general guidelines useful for a wide range of inspection activities for monitoring the safety and quality of foods. Introduction- General Inspection Approach- Sampling; Establishment Inspection- Subjective and Objective Methods- Special Investigations- Evidence Development- Voluntary and Mandatory Compliance- Export-Import Surveillance- Foreign Bodies in Food.

Food Borne Diseases/Toxicology

This course is designed to provide the student with the knowledge of the biological and chemical agents associated with foods and their effect on human health. Introduction- Chemical Toxicants in Food: an Overview, Naturally Occurring Toxicants- Unnatural Chemical Agents: Accidental- Unnatural Chemical Agents: Additives, Nutritional Biohazards- Food Irradiation: Food Processing, Nutritional Quality and Safety- Biological Agents.

General Physics

This is an introductory level Physics course designed to extend the student's knowledge and understanding of basic Physics principles, concepts, and applications. A selection of practical exercises designed to augment and extend classroom instruction will complement the course. The Nature of Physics- Motion and Vectors- Dynamics- Work, Energy, and Power- Properties of Matter- Wave Motion- Fluid Mechanics- Vibrations and Wave Motion- Sound- Kinetic Theory- Heat and Heat Transfer- Light.

Food Engineering

This is an advanced level course designed to provide the student with a rudimentary understanding of food engineering principles enabling students to comprehend food engineering applications and unit operations. Introduction- Energy and Mass- Liquid Food Transport/Rheology- Energy for Food Processing- Heat Transfer in Food Processing- Refrigeration- Freezing of Food- EvaporationPsychometrics- Dehydration of Foods.

Technology of Processing Canning & Wrapping of Sea Food

The Egyptian Food Industry Code of Practice for the Heat Processing of Low Acid and Acidified Low Acid Foods in Hermetically Sealed Containers states that supervisors and operators responsible for processing systems, retorts, aseptic processing and packaging systems and product formulating systems and container closure inspectors should have attended an approved school and have been identified by that school as having satisfactorily completed the prescribed course of instruction. Introduction to Site Microbiology- Product Preparation- Processing Equipment and Procedure- Container Integrity- Post Container Handling- Incubation- Regulations and Codes of Practice. This course is designed to familiarize students with the techniques and technology involved in the production of seafood products. Fisheries Overview- Preservation Methods- Primary Processing- Secondary Processing- Byproducts Utilization.

Water and Wastewater Microbiological Analysis

This course is designed to provide an overview of microorganisms related to water and wastewater and the techniques for monitoring the microbiological safety and quality of water. Water and Wastewater Microbiological Examination of Water- Drinking Water Guidelines- Waterborne

Pathogens and Parasites- Microbial Indicators of Pollution- Microbiological Examination of Water- Toxicity Testing in Wastewater- Treatment using Microorganisms- Biofilms- Anaerobic Digestion of Wastewater and Sludge- Biological Aerosols and Bioodors from Wastewater Treatment Plants- Microbiological Aspects of Drinking Water Treatment- Microbiological Aspects of Drinking Water Distribution- Pollution Control Biotechnology- Public Health Aspects of Wastewater and Biosolids Disposal.

Water and Wastewater Treatment

This course is designed to enhance the student's understanding of the technical skills required for water and wastewater treatment processes. It will focus on system analysis and trouble shooting. Water Process Treatment Train- Wastewater Process Treatment train- Basic Fluid Mechanics- Water Treatment Operations- Wastewater Treatment Operations- Water Stabilization- Instrumentation and Controls Systems for Water and Wastewater Systems- Water Distribution System Operation and Maintenance- Water Treatment Plant Operation and Maintenance- Wastewater Collection System Operation and Maintenance- Wastewater Treatment Plant Operation and Maintenance- Septic Tanks and Associated Pumps- Safety- Administration and Record Keeping.

Molecular and Cell Biology

Cell structure- the principles of how individual components of cells work along with how they work together- molecular biology of prokaryotic and eukaryotic cells- viruses- DNA replication and the structure of genes and chromosomes.

Food Biotechnology

This is an advanced level course designed to provide the student with an understanding of the various aspects of food biotechnology Overview: Food Biotechnology- Tools of Biotechnology- Cell Culture Technology- Plant Cell Culture- Fermentation Technology- Enzyme Technology- Immobilization Technology- Applications in Agriculture- Applications in Food- Marine Biotechnology- Safety of Foods Developed by Biotechnology- Biotechnology in Waster Management in Food Industry- Biosensors for Biological Monitoring- Safety and Regulatory Issues of Biotechnology derived Foods.

Marine Biotechnology

This course covers the application of molecular techniques to study the marine environment and obtain useful products from marine systems. Students examine recent progress in discovery of drugs and enzymes from marine microbes and macroorganisms, biodiversity, bioremediation, molecular

approaches in aquaculture, the role of marine microbes in global carbon cycling and genomics of marine organisms

Nanotechnology and its applications

Introduction to the science of nanotechnology- using of nanotechnology in water filtration, improvement of aquatic environment and in fish and shellfish nutrition, reproduction ,vaccination, rapid disease detection, enhancing the ability of fish to absorb drugs like hormones, vaccines and nutrient, fish breeding, harvest and postharvest technology.