

الرقم: 358 / 2015 / 1

التاريخ: 2015 13 13

رئاسة الجامعة
University Administration

الدكتور عميد كلية العلوم البحرية / فرع العقبة

تحية طيبة، وبعد،،

ناقشت لجنة الخطة الدراسية في جلستها رقم (٢٠١٥/٢٠١٤/١) والمنعقدة بتاريخ ٢٠١٥/٢/٥، كتاب مدير مركز الاعتماد وضمان الجودة رقم ١٧/٢٠١٤/٤٥ تاريخ ٢٠١٥/١/٢٥ والمتضمن طلب الموافقة على السير بإجراءات اعتماد خطة برنامج البكالوريوس في البيئة الساحلية / فرع العقبة، وذلك بعد أن قامت الكلية بعمل التعديلات المطلوبة على الخطة، وبعد المناقشة قررت الموافقة على السير بإجراءات اعتماد خطة برنامج البكالوريوس في البيئة الساحلية / فرع العقبة، حيث يتم البدء بتطبيق الخطة في العام الجامعي ٢٠١٦/٢٠١٥.

وتفضلوا بقبول فائق الاحترام،،

مقرر اللجنة

نائب الرئيس لشؤون الكليات العلمية



الأستاذ الدكتور عزمي محافظة

نسخة / الأستاذ الدكتور نائب الرئيس لشؤون الكليات الانساقية / رئيس فرع العقبة.

نسخة الدكتور مدير وحدة القبول والتسجيل.

نسخة الأستاذ الدكتور مدير مركز الاعتماد وضمان الجودة.

نسخة لشكورة ديابا حميدي / كلية العلوم التربوية.

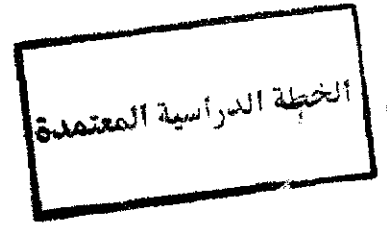
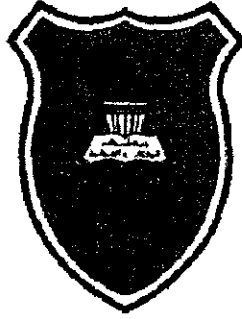
نسخة / السيدة رفاء الخطيب / امينة مرر للجنة.

هاتف - ٥٢٥٥٠٠٠ (٦-٩٦٢) فرعي - ٢١١٢٠ فاكس - ٥٢٥٥٥١١ (٦-٩٦٢) فرعي - ٢١٠٣٥ عمان ١١٩٤٢ الأردن

Tel.: (962-6)5355000 Ext.: 21120 Fax: (962-6)535511 Ext: 21035 AMMAN 11942 JORDAN

E-mail: admin@ju.edu.jo

http://www.ju.edu.jo



The University of Jordan / Aqaba

Academic Program

For the Bachelor Degree

In

Coastal Environment

Faculty of Marine Sciences

2014


2/10/14/14

Department of coastal environment
 Faculty of Marine Sciences
 University of Jordan/Aqaba

**Curriculum for the Bachelor Degree
 In
 Coastal Environment**

Name of Degree: B.Sc. In Coastal Environment

Name of Degree (in Arabic): البكالوريوس في البيئة الساحلية

A. Curriculum Components: Students studying for the Bachelor's Degree in Coastal Environment must successfully complete (132) credit hours distributed as follows:

Serial	Type of Requirement	Credit Hours
First (I)	University Requirements	27
	Mandatory	12
	Electives	15
Second (II)	Faculty Requirements	23
Third (III)	Specialization Requirements	82
	Mandatory	64
	Electives	18
Total		132

B. Numbering system:

1. Departments' codes:

Number	Department
1	Marine Biology
2	Coastal Environment

2. Courses' codes:

Field code	Specialization address
0	Ecology
1	Practical
2	Chemistry
3	Physics
4	Geology
5	Computer Sciences
6	Marine Management & Marine Economy
7	Seminar, research & Field Training

3. Course series

55	02	1	1	1
Faculty	Department	level	Specialization	Series

II. University Requirements: (27) credit hours

a. Mandatory: (12) credit hours as follows:

Course No.	Course title	Credit Hours	Prerequisite
5112100	Communication skills in Arabic language	3	-
5101100	Communication skills in English language	3	-
5151100	Military sciences	3	-
5152100	National education	3	-

- b. Elective: (15) Credit hours, the student choose from the three discipline groups outlined below, with minimum one course from each discipline, and maximum two courses from each discipline, as long these courses are not among the courses offered in the student's academic department.

First Discipline: Humanities

Course No.	Course title	Credit Hours	Prerequisite
5102100	Human Civilization	3	-
5111100	Islamic Culture	3	-
5121100	Islamic System	3	-
5132100	Creative Writing	3	-
5141100	Legal Education	3	-
5142100	Art Appreciation	3	-

5161100	Foreign Languages	3	-
5162100	Human Rights	3	-
5313100	Sports and Health	3	-
4502100	Introduction to Libraries and Information Sciences	3	-
5213100	Principles of Administration	3	-

Second Discipline: Social and Economic Sciences

Course No.	Course title	Credit Hours	Prerequisite
5101104	History of Jordan and Palestine	3	-
5122100	Principles of Psychology	3	-
5131100	Logic and Criticism	3	-
5171100	Principles of Politics	3	-
5172100	Introduction to Sociology	3	-
5181100	Principles of Social Work	3	-
5201100	Global Political Economy	3	-
5311100	Geography of Jordan	3	-
5321100	Jordan Archeology	3	-

Third Discipline: Sciences and Technology, Agriculture and Health

Course No.	Course title	Credit Hours	Prerequisite
5182100	Principles of Public Health	3	-
5191100	Principles of Scientific Research	3	-
5213100	Principles of Energy and Economic	3	-
5301100	First Aid	3	-
5303100	Principles of Human Nutrition	3	-
5312101	Jordanian Industries	3	-
5501100	Science and Society	3	-
5502100	Environmental Science	3	-
5512100	House Agriculture	3	-
5522100	Principles of Public Safety	3	-

II. Faculty Requirements: (23) Credit Hours:

- a. **Mandatory:** (23) credit hours.
- b. **Electives:** None
- c. **Specialty Conditions:** None

a. Mandatory: (23) credit hours.

Course No.	Course title	Weekly Hours		Cr. Hours	Prerequisite
		Theory	Practical		
5401101	Calculus	3	-	3	-
5401131	Principles of statistics	3	-	3	-
5401201	Computer Skills	3	-	3	-
5501101	General biology (1)	3	-	3	-
5502101	General chemistry (1)	3	-	3	-
5512101	General physics	3	-	3	-
5512111	General physics – lab	-	3	1	5512101 or Concurrently
5522101	General geology	3	-	3	-
5522111	General geology – lab (1)	-	3	1	5522101 or Concurrently

b. Electives: None

c. Specialty Conditions: None

III. Department Requirements: (82) Credit hours as follows:

a. Mandatory: (64) Credit hours.

b. Training: (0) Credit hours - 8 Weeks Practices on Rescue Operation, Evacuation and Displacement.

c. Elective: (18) Credit hours.

a. **Mandatory** : (64) Credit hours, as follows:

Course No.	Course title	Weekly Hours		Cr. Hours	Prerequisite
		Theory	Practical		
5501102	General biology (2)	3	-	3	5501101
5501113	Practical General biology	-	3	1	5501101 or Concurrently
5501231	Organic chemistry	3	-	3	5502102
5501301	Marine Biology	2	3	3	5501102
5501302	Practical marine Biology	-	3	1	5501301 or Concurrently
5502102	General chemistry (2)	3	-	3	5502101
5502113	Practical General chemistry	-	3	1	5502102 or Concurrently
5502202	Coastal Ecology and Marine Ecosystems	3	-	3	5501102 or Concurrently
5502211	Analytical chemistry	3	-	3	5502102
5502212	Analytical chemistry-Lab	-	3	1	5502211 or Concurrently
5502221	Marine Sciences	3	-	3	5501102 + 5502102
5502241	Physical oceanography	3	-	3	5512101
5502251	Marine chemistry	3	-	3	5502102
5502261	Marine Geology (1)	3	-	3	5522101
5502301	Marine Environment Laws	3	-	3	5502202
5502465	Integrated coastal zone management	3	-	3	5502202
5502302	Pollution of marine environment	3	-	3	5502202
5502341	Water circulation	3	-	3	5502241
5502360	Geographic Information Systems (GIS)	2	3	3	5502202
5502363	Geological processes in coastal areas	3	-	3	5502241 + 5502261
5502422	Environment Impact Assessment (EIA)	3	-	3	5502202
5502463	Marine Geophysics	2	3	3	5502363
5502471	Field Training	-	20	6	Department Approval

b. **Training**: (0) Credit hours - 8 Weeks Practices on Rescue Operation, Evacuation and Displacement

c. Elective: (18) Credit hours are chosen by the student from the following table:

Course No.	Course title	Weekly Hours		Cr. Hours	Prerequisite
		Theory	Practical		
5502231	Dive science	1	6	3	5502221
5501342	Algae and Seagrasses	2	3	3	5501102
5501351	Benthos and coral reefs	2	3	3	5501102
5501353	Fish Biology	2	3	3	5501102
5502403	Methods of protecting coastal environment and Natural Reserves	3	-	3	5502202
5502201	Red Sea environment	3	-	3	5501102
5502361	Element cycle in marine waters	3	-	3	5502251
5502362	Marine Geology (2)	3	-	3	5502261
5502401	Environmental inspection and auditing	3	-	3	5502202
5502442	Meteorology and climate change	3	-	3	5502241
5502461	Environmental computer application	3	-	3	5502202
5502464	Marine sediments	3	-	3	5502363
5502491	Special Topics I	-	3	1	Department approval
5502492	Special Topics II	-	6	2	Department Approval
5502493	Special Topics III	-	9	3	Department Approval
5502332	Methods of marine measurements	3	-	3	5502241 + 5502211
5502441	Remote sensing	2	3	3	5501102
5501354	Mariculture	3	-	3	5501102
5501452	Marine Resources	3	-	3	5501102
5502365	Marine Environment economy	3	-	3	5501102

Courses taught by the Department

5502211

Course No.	Course title	Weekly Hours		Cr. Hours	Prerequisite
		Theory	Practical		
5502100	Environmental Science	3	-	3	-
5502101	General chemistry (1)	3	-	3	-
5502102	General chemistry (2)	3	-	3	5502101
5502113	Practical General chemistry	-	3	1	5502102 or Concurrently
5512101	General physics	3	-	3	-
5512111	General physics – lab	-	3	1	5512101 or Concurrently
5522101	General geology	3	-	3	-
5522111	General geology – lab (1)	-	3	1	5522101 or Concurrently
5512099	Pre Physics	3	0	0	-
5502099	Pre chemistry	3	0	0	-
5502202	Coastal Ecology and Marine Ecosystems	3	-	3	5501102 or Concurrently
5502211	Analytical chemistry	3	-	3	5502102
5502212	Analytical chemistry-Lab	-	3	1	5502211 or Concurrently
5502221	Marine Sciences	3	-	3	5501102 + 5502102
5502241	Physical oceanography	3	-	3	5512101
5502251	Marine chemistry	3	-	3	5502102
5502261	Marine Geology (1)	3	-	3	5522101
5502301	Marine Environment Laws	3	-	3	5502202
5502465	Integrated coastal zone management	3	-	3	5502202 or Concurrently
5502302	Pollution of marine environment	3	-	3	5502102
5502341	Water circulation	3	-	3	5502241
5502360	Geographic Information Systems (GIS)	2	3	3	5502202
5502363	Geological processes in coastal areas	3	-	3	5502241 + 5502261
5502422	Environment Impact Assessment (EIA)	3	-	3	5502202
5502463	Marine Geophysics	2	3	3	5502363
5502231	Dive science	1	6	3	5502221
5502403	Methods of protecting coastal environment and Natural Reserves	3	-	3	5502202
5502201	Red Sea environment	3	-	3	5501102
5502361	Element cycle in marine waters	3	-	3	5502251
5502362	Marine Geology (2)	3	-	3	5502261
5502401	Environmental inspection and auditing	3	-	3	5502202
5502442	Meteorology and climate change	3	-	3	5502241

5502461	Environmental computer application	3	-	3	5502202
5502464	Marine sediments	3	-	3	5502363
5502491	Special Topics I	-	3	1	Department approval
5502492	Special Topics II	-	6	2	Department Approval
5502493	Special Topics III	-	9	3	Department Approval
5502332	Methods of marine measurements	3	-	3	5502241 + 5502211
5502441	Remote sensing	2	3	3	5501102
5502365	Marine Environment economy	3	-	3	5501102
5502471	Field Training	-	20	6	Department approval



Guidline Plan for students in the Department of the coastal environment

First year -the second semester		
Hour	Article	No.
3	General biology (2)	5501102
3	General chemistry (2)	5502102
1	Practical General chemistry	5502113
3	General physics	5512101
1	General physics – lab	5512111
3	Communication skills in English language	5101100
3	Elective Course (University Requirements)	
17		Total

First year - the first semester		
Hour	Article	No.
3	General Biology (1)	5501101
1	Practical General Biology	5501113
3	General chemistry (1)	5502101
3	General geology	5522101
1	General geology – lab (1)	5522111
3	Computer Skills	5401201
3	Elective Course (University Requirements)	
17		total

Second Year - second semester		
Hour	Article	No.
3	Principles of statistics	5401131
3	Calculus	5411101
3	Organic chemistry	5501231
3	Marine Chemistry	5502251
3	Marine Geology (1)	5502261
3	Elective Course (University Requirements)	
18		Total

Second Year - first semester		
Hour	Article	No.
3	Marine sciences	5502221
3	Analytical chemistry	5502211
1	Analytical chemistry-Lab	5502212
3	Coastal Ecology and Marine Ecosystems	5502202
3	Physical oceanography	5502241
3	Communication skills in Arabic language	5112100
16		Total

5/2/2014 2:00:00 PM

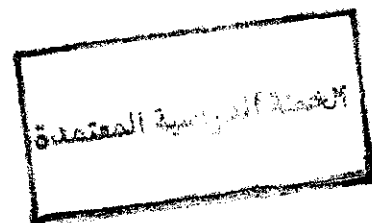
Third year - second semester		
Hour	Article	No.
3	Pollution of marine environment	5502302
3	Geographic Information Systems (GIS)	5502360
3	Marine Environment Laws	5502301
3	Military sciences	5151100
3	Elective Courses (Faculty Requirements)	
3	Elective Courses (Faculty Requirements)	
18		Total

Third year - first semester		
Hour	Article	No.
3	Marine Biology	5501301
1	Practical Marine Biology	5501302
3	Water circulation	5502341
3	Geological processes in coastal areas	5502363
3	National education	5152100
3	Elective Courses (Faculty Requirements)	
16		Total

Fourth year - second semester		
Hour	Article	No.
3	Environment Impact Assessment (EIA)	5502422
6	Field Training	5502471
3	Elective Courses (Faculty Requirements)	

12		Total

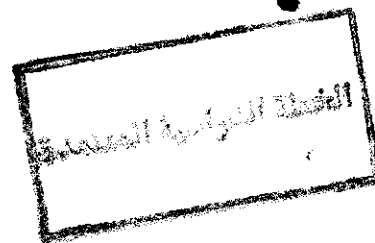
Fourth year - first semester		
Hour	Article	No.
3	Marine Geophysics	5502463
3	Integrated coastal zone management	5502465
3	Elective Courses (Faculty Requirements)	
3	Elective Courses (Faculty Requirements)	
3	Elective Course (University Requirements)	
3	Elective Course (University Requirements)	
18		Total



Course Description

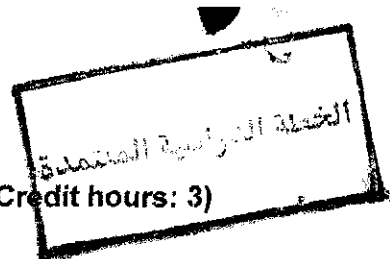
Bachelor Program in Coastal Environment

- 5502100 Environmental Science (Credit hours: 3)**
Prerequisite: -
This course aims at introducing the student to the rudiments of environmental science whose corner stone was laid in the second half of the 20th century. This is being accomplished by discussing the following topics: The earth and natural hazards, Ecosystems, Biogeochemical Cycles, Man and the Environment and the Natural Resources in the Solid Earth System, Air Pollution, Water Resources, management and Pollution, Solid Waste, Food and Health, Environmental Impact Assessment.
- 5502101 General chemistry (1) (Credit hours: 3)**
Prerequisite: -
Scientific Measurements; Stoichiometry; Chemical reactions, Atomic structure, Molecular structure, Periodic table, Chemical bonding, Gases and their laws, States of matter and forces among molecules.
- 5502102 General chemistry (2) (Credit hours: 3)**
Prerequisite: 5502101
Chemical kinetics, Thermochemistry and thermodynamics, Electrochemistry, Acids and bases, Chemical equilibrium, Precipitation reactions, Introduction to organic chemistry.
- 5502113 Practical General chemistry (Credit hours: 1)**
Prerequisite: 5502102 or concurrently
Lab. safety and basic Lab. techniques, Formula of hydrate, Empirical formula of a compound, Limiting reactant, Periodic chart and periodic law, Spectroscopy and molecular geometry, Properties of inorganic compounds and metathesis reactions, Molecular weight of a volatile liquid, Aspirin synthesis, Standardization of NaOH solution, Equivalent weight of an acid, Colligative properties (FW Determination) Calorimetry, Determination of a Rate Law, Spectrophotometric determination of an equilibrium constant, Equilibrium constant for a slightly soluble salt, Solubility product constant and common-ion effect, Bleach analysis, Preparation of Nickel (II) complex, qualitative analysis: Common anion, Qualitative analysis: Group I cations, Group II cations, Group III cations and general unknown

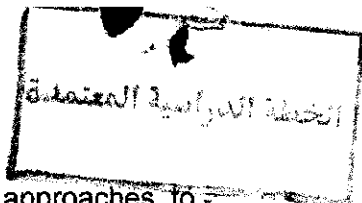


- 5502201 Red Sea Environment (Credit hours: 3)**
Prerequisite: 5501102
Historical information of Red Sea origin and formation, geography features, climate, general characteristics and of the Red Sea
- 5502202 Coastal Ecology and Marine Ecosystems (Credit hours: 3)**
Prerequisite: 5501102 or Concurrently
Introduction to aquatic systems to include estuaries, mangroves, coral reefs, seagrass beds, lagoons, beaches, intertidal zones and tidal flats. The course will introduce also the interaction between marine and terrestrial environment systems for ecological and socio-economic objectives. It will provide information on the different marine ecosystems and their integrated role with the entire marine environment. The course will provide snapshots and brief description about global change to include paleo-reconstruction of past lagoon environments, fossil coral reefs, dune systems and land use.
- 5502211 Analytical chemistry (Credit hours: 3)**
Prerequisite: 5502102
Introduction, Errors and treatments of analytical data, Titrimetric methods of analysis, Gravimetric methods of analysis, Review of chemical equilibrium, Acid-base equilibrium, Acid-base equilibrium in complex systems, Complex formation titrations, Solubility equilibrium, Oxidation reduction equilibrium, Application of oxidation reduction titrations.
- 5502212 Analytical Chemistry-Lab (Credit hours: 1)**
Prerequisite: 5502211 or Concurrently
Statistical treatment of data, gravimetric analysis, acid-base titrations, precipitation titrations, complexometric titrations, redox titrations.
- 5502221 Marine Sciences (Credit hours: 3)**
Prerequisite: 5502102 + 5501102
Detailed information on processes of biological, chemical, physical and geological that affect the marine environment for animal and marine plants.

- 5502231 Dive science (Credit hours: 3)**
Prerequisite: 5502221
 Introduction, diving theory, confined water dives theoretical and practical, open water dives
- 5502241 Physical oceanography (Credit hours: 3)**
Prerequisite: 5512101
 Introduction, ocean dimensions-shapes and bottom materials, physical properties of seawater, typical distributions of water characteristics in the oceans, water salt and heat budgets of the oceans, instruments and methods, circulation and water masses of the oceans, coastal oceanography, the basic physical laws used in oceanography, equation of motion in oceanography, Geostrophic flow, Wind-driven circulation, waves, tides
- 5502251 Marine chemistry (Credit hours: 3)**
Prerequisite: 5502102
 Physical properties of sea water, major and elements of sea water, dissolved gases in the sea, dissolved and particulate matter in the sea.
- 5502261 Marine Geology (1) (Credit hours: 3)**
Prerequisite: 5522101
 Historical background, ocean basin tectonics, origin of the oceans, ocean morphology, ocean basins, continental margins, trenches, mid oceanic ridges, submarine canyons, deep ocean floor, evolution (structure and formation) of ocean basins, seafloor spreading, magnetic strips, marine sediments, sediment cycle, sources and types of marine sediments, sedimentation rates, sea level changes and history.
- 5502301 Marine Environment Laws (Credit hours: 3)**
Prerequisite: 5502202
 Marine Environment laws in Jordan, Marine Environment laws in Aqaba Special Economic Zone, Global and Regional Marine Environment laws and Conventions.
- 5502302 Pollution of marine environment (Credit hours: 3)**
Prerequisite: 5502102
 Types of marine pollution, organic and inorganic pollution, nutrient pollution, petroleum and oil pollution.



- 5502465 Integrated Coastal Zone Management (Credit hours: 3)**
Prerequisite: 5502202 or Concurrently
Beaches calcification, ambient dangers and hazards on coastal areas (human pressure, natural disasters, erosion, economic development, climate change), methods of mitigations and defenses against ambient dangers and hazards on coastal areas, sustainable development in coastal areas, mathematical models in beaches management.
- 5502332 Methods of Marine Measurements (Credit hours: 3)**
Prerequisite: 5502241 + 5502211
Methods of Chemical measurements, applications of atomic absorption spectroscopy, atomic emission spectroscopy, molecular ultraviolet / visible spectroscopy, introduction to chromatography. Methods of sample collection and physical measurements. The course includes experiments dealing with the topics: Nutrient analysis, Chlorophyll a analysis, dissolved oxygen, total hydrocarbon determination, Heavy metal analysis, physical measurements including salinity, density, temperature, currents.
- 5502341 Water Circulation (Credit hours: 3)**
Prerequisite: 5502241
The atmosphere and the ocean, ocean currents, gyres in oceans, the other major current systems, global fluxes and the deep circulation
- 5502360 Geographic Information Systems (GIS) (Credit hours: 3)**
Prerequisite: 5502202
The course aims at dealing with the principles of GIS, such as: Definitions, development, components, and their theories. Several subjects will be taught such as: database construction which includes building of geographical data and their attributes. Also, manipulating database according to symbolizing, charting, tabling, matching, buffering, merging and making successive output.
- 5502361 Elements Cycle in Marine Waters (Credit hours: 3)**
Prerequisite: 5502251
Carbon, Nitrogen and Phosphorus cycles. Relations between different cycles with each other and with air. Impact of climate change on different cycles.
- 5502362 Marine Geology (2) (Credit hours: 3)**
Prerequisite: 5502261



Ocean evolution, glacial ages, sea level processes, approaches to paleoceanography and deep sea records, sediment history of ocean basins, paleoclimatology and climate zonation on marine sediments, hydrothermal activity, resources from ocean floor.

5502363 Geological Processes in Coastal Areas (Credit hours: 3)

Prerequisite: 5502241 + 5502261

Factors affecting coast formation, coastal geomorphology shallow water environments and their sediments, principles and process of sediment transport, beach erosion, beach classification, sea level change during quaternary, estuaries, deltas, continental shelf, waves, tides, control of sediment processes.

5502401 Environmental Inspection and Auditing (Credit hours: 3)

Prerequisite: 5502202

Definition of inspection and auditing, Importance, Procedures, and Documentation.

5502403 Methods of Protecting Coastal Environment and Natural Reserves (Credit hours: 3)

Prerequisite: 5502202

Coastal environment ecosystems, targets of environment protection, environment protection (air, marine, soil, planet, terrestrial and marine animals), types of natural protectorate areas, national strategy for environment protection and environment laws in Jordan

5502422 Environment Impact Assessment (EIA) (Credit hours: 3)

Prerequisite: 5502202

Collection of the required data on each environmental component of a project or problem. Evaluation and comparison of the collected data, with the standards and regulations, prediction of the impacts on the biotic and a biotic parameters. Mitigation measures to minimize or eliminate impacts, impacts monitoring during and after the project execution. Live examples.

5502441 Remote Sensing (Credit hours: 3)

Prerequisite: 5501102

This course concentrates on the definition of remote sensing and its role in geographical and environmental research, geometrical properties of aerial photographs, principles of photo-interpretation, and the geographical and environmental applications of aerial photography. Electromagnetic radiation and its interaction with surface material, and

land use. Different types of imaging sensors, and imageries. Principles of digital image processing and interpretation. General application of satellite imageries in geographic research.

5502442 Meteorology and Climate Change (Credit hours: 3)

Prerequisite: 5502241

Principal concepts (thin layer and the stratification of the atmosphere, atmospheric energy, sun and its role in the atmospheric energy, the dynamic atmosphere and balance) monitoring of climatic components (temperature, humidity, wind, pressure), atmosphere conditions, cloud physics, radiation in atmosphere, methods of climate prediction, climate change.

5502461 Environmental Computer Application (Credit hours: 3)

Prerequisite: 5502202

General principles of mathematical modeling and problem solving, Introduction to computer tools, Analytical models based on differential equations, Analytical models based on stable states, Estimating model coefficients from experimental data, Principles of computer programming, Models of ecological populations and communities, Hydrologic models, Compartmental models of biogeochemical cycling, Diffusion models, Analysis of current environmental problems.

5502463 Marine Geophysics (Credit hours: 3)

Prerequisite: 5502363

This course covers the geophysical nature of the seafloor and marine subbottom, generation, use, and interpretation of reflection and side-scan sonar records, seismic and magnetic anomalies of various marine environments and seafloor features and structures. The course contains 3 hours/week laboratory and field component.

5502464 Marine Sediments (Credit hours: 3)

Prerequisite: 5502363

Mineral composition of marine sediments, transport, deposition and burial diagenesis of marine sediment, origin, sources and chemical composition of marine sediments. Texture properties, mineral resources. The course contains 3 hours/week laboratory and field.

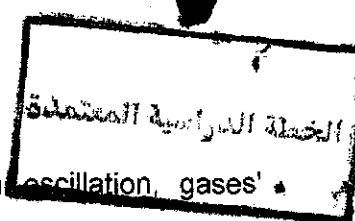
5502365 Marine Environment Economy (Credit hour:3)

Prerequisite: 5501102

An introduction to the concept of the environmental economics and the to the concepts Environmental Science , types of environment, and natural capacity, the concept of the environment from the perspective of economic development and economic and social importance of the

environment pollution-free, that will ensure sustainable development. features of sustainable development in an environment pollution-free, resources management, the historical development of the relationship between human and the environment in its various forms, in addition to study aspects of the natural environment and cultural, in preparation for finding appropriate solutions to avoid these problems, environmental pollution and its devastating effects on the national economy, types of pollution, environmental problems are the main sources of pollution, by applying of regional planning methods to urban and environmental together to integrate environmental considerations into decision-making processes for development in various areas

- 5502491 Special Topics I (Credit hours: 1)**
 Prerequisite: Department approval
 Determine a specific scientific problem and solve it through scientific process, and write the result in a scientific report.
- 5502492 Special Topics II (Credit hours: 2)**
 Prerequisite: Department approval
 Determine a specific scientific problem and solve it through scientific process, and write the result in a scientific report.
- 5502493 Special Topics III (Credit hours: 3)**
 Prerequisite: Department approval
 Determine a specific scientific problem and solve it through scientific process, and write the result in a scientific report.
- 5512101 General Physics (Credit hours: 3)**
 Prerequisite: -
 Motion in one dimension, vectors, motion in two dimensions, the law of motions, Circular Motion and Other Applications of Newton's Laws, Energy and Energy Transfer, Potential Energy, Linear Momentum and Collisions, Rotation of a Rigid Object about a Fixed Axis, Angular Momentum, Gravitation, Fluid Mechanics.
- 5512111 General Physics – lab (Credit hours: 1)**
 Prerequisite: 5512101 or concurrently
 This lab consists of 12 experiments, collecting and analyzing data, measurement and precise, vectors, forces table, motion in one dimension, force and motion, Newton's laws, collisions in two



dimensions, rotational motion, simple pendulum oscillation, gases' laws, viscosity parameter, and specific heat.

- 5522101 General Geology (Credit hours: 3)**
Prerequisite: -
Formation of earth, structure, composition, types of rocks and minerals and their classification, internal dynamic forces, principles of structural geology, earthquakes, volcanoes, mountains formation, plate tectonic theory, geological time scale, mineral ores, geology of Jordan.
- 5522111 General Geology – lab (1) (Credit hours: 1)**
Prerequisite: 5522101 or concurrently
Crystallography and mineral crystal systems, crystal forms, main mineral groups and their classification, main rock groups; sedimentary, igneous, and metamorphic, structure and texture of these rocks and their classification, field visits and geological reports, geological maps and cross sections of horizontal and inclined beds.
- 5502471 Field Training (Credit hours: 6)**
Prerequisite: Department approval
The student will be trained in government and non-governmental organizations on environmental issues in Aqaba and how to treat them, and promote environmental awareness among the local community
- 5512099 Pre Physics (Credit hours: 0)**
Prerequisite: -
An introduction about physical units, vectors, motion in one dimension, motion in two dimensions, force, Newton law's and their applications, work and energy, collisions and conservation of linear momentum, fluid mechanics and dynamics, vibrations and waves.
- 5502099 Pre chemistry (Credit hours: 0)**
Prerequisite: -
Scientific measurement, Physical properties of solutions, chemical calculation, chemical kinetics, chemical and molecular formula, periodic table, chemical bond, gases laws, chemical equilibrium, acids and bases, acid-base equilibrium in aqueous solutions, solubility equilibria, chemical thermodynamics, electro chemistry.