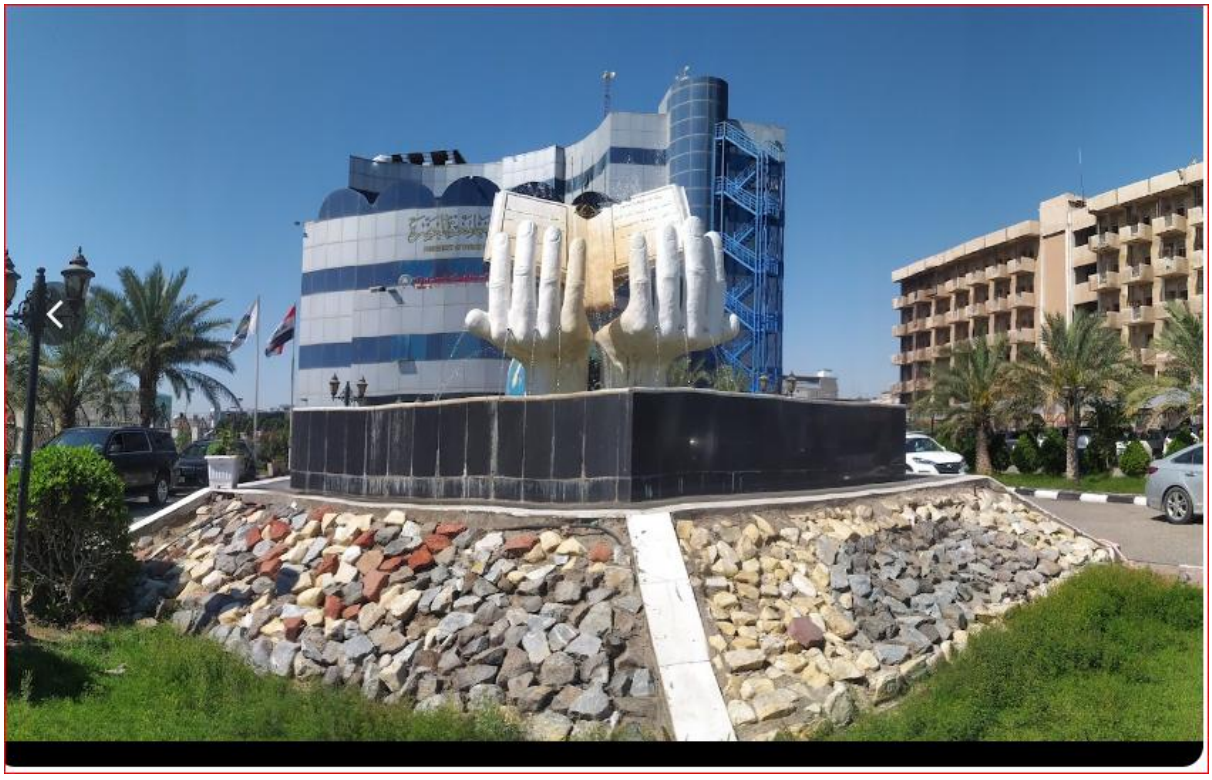
University of Basrah
Marine science college

قسم علوم البحار الطبيعية

First Cycle – bachelor's degree (B.Sc.) – Natural marine science



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1. Overview

This catalogue is about the courses (modules) given by the program of Electrical Engineering to gain the Bachelor of Science degree. The program delivers (48) Modules with (6000) total student workload hours and 240 total ECTS. The module delivery is based on the Bologna Process.

نظره عامه

يتناول هذا الدليل المواد الدراسية التي يقدمها برنامج قسم علوم البحار الطبيعية على درجة بكالوريوس العلوم البحرية. يقدم البرنامج 48) مادة دراسية، ، مع (٦٠٠٠) إجمالي ساعات حمل الطالب و ٢٤٠ إجمالي وحدات أوروبية. يعتمد تقديم المواد الدراسية على عملية بولونيا.

2. Undergraduate Courses 2023-2024

Module 1

Code	Course/Module Title	ECTS	Semester
MSPH 101	General physical	7	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	2	77	98
Description			
General Physics It aims to develop the student's ability to understand and apply a number of issues based on basic mechanical principles, and to provide the student with the ability to interpret some environmental phenomena related to movement and their applications and to build the basic basis for understanding the subsequent courses.			

Module 2

Code	Course/Module Title	ECTS	Semester
MSCH102	General chemistry	7	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	2	77	98
Description			
It is a science that investigates the study of chemical compounds and the discovery of new compounds with multiple properties and applications that mainly contribute to the development of industry and technology. - Dealing on the basis of quotation and then learning with the aim of developing the mental ability of the student. - Developing the student's ability to collect and apply information.			

Module 3

Code	Course/Module Title	ECTS	Semester
UBCO 106	Computer	5	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	2	77	48
Description			
The Computer Course in the College of Marine Science is intended to build a basic knowledge of the academic needs of computers. The course syllabus is designed to meet the course deadline along a period of 15 weeks. The main content of the syllabus focuses upon teaching the structure of a computer, the hardware, software, and what is an operating system (with more details of the Windows Operating System). The syllabus then moves to some applications and introduce- in details- two main Office programs, namely Microsoft Word and PowerPoint. These two programs are significant for students to enable them make the required reports and presentations in the other courses.			

Module 4

Code	Course/Module Title	ECTS	Semester
UBEN 107	English	4	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
4		62	38
Description			
The English Language Course in the College of Marine Science is intended to review some basic language grammar and enhance the students' storage of vocabulary in the field of marine science. The course syllabus is designed to meet the course deadline along a period of 15 weeks. The main content of the syllabus in based of teaching English for special purposes since the students of the college are specialized in a non EFL specialization. The course focuses on a variety of main marine topics like marine geology, marine biology, marine physics and environment in a linguistics way with focus on reading skill, grammar, and public speaking.			

Module 5

Code	Course/Module Title	ECTS	Semester
MSMA 108	Marine Art	3	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3		47	28
Description			
This course aims to identify all the factors that affect the maneuvering and handling of ships. They will be able to plan line-up or grappling actions, taking into account prevailing wind and tide conditions and the characteristics of their vessel, and make use of auxiliary tugs when necessary.			

They will also be able, after gaining experience in sailing or training in navigational simulators, to handle the ship to reduce the risk of damage or running aground caused by bad weather. Officers will be aware of the hazards that must be encountered when navigating ice areas or conditions of ice accumulation on board and the precautions that must be taken for the safety of the ship and crew.

Module 6

Code	Course/Module Title	ECTS	Semester
MSMS 105	**Oceanography**	**4**	**1**
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	**1**	**47**	**28**
Description			
Oceanography is the science concerned with the study of the physical, chemical, and biological features of the ocean, including the ancient history of the oceans and their current and future states. Scientists have increased interest in it in recent years due to the oceans being threatened by climate change and the high level of pollution caused by humans, whether through waste disposal or deliberately killing and reducing the water area, which eventually led to the erosion of coastlines. Knowledge of the world's oceans enables us to predict more accurately some of the incidents that occur on a daily basis. For example, we can know the relationship of the oceans to weather and climate changes in the long term, and this also leads to the exploitation of Earth's resources more effectivel			

Module 7

Code	Course/Module Title	ECTS	Semester
MSGE 103	**General Geology**	**7**	**2**
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	**2**	**77**	**28**
Description			
Definition of geoscience, structure of the Earth's interior, plate tectonics theory Crystal elements, crystal systems Cohesive and optical properties of minerals Crystals, minerals, rocks, the rock cycle in nature Igneous rocks, sedimentary rocks, metamorphic rocks Primary geological structures, secondary geological structures, earthquake studies Explanation of topographic maps . Introduction, gravitational, magnetic, seismic, electromagnetic, ground radar, radiological, and geothermal methods.			

Module 8

Code	Course/Module Title	ECTS	Semester
MSBI 104	General Biology	7	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	2	77	28
Description			
Definition biology ,chemical basis for life (non-organic component and organic compounds of living organisms} .The vital interaction and enzymes .Cells and tissues : structure and functions –the division and classification of viruses – bacteria –algae –five kingdoms monera ,protista,fungi ,plantae and animalia			

Module 9

Code	Course/Module Title	ECTS	Semester
MSFE 109	Fundamental of Ecology		2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	62	28
Description			
Ecology is the branch of biology that studies the interactions between living organisms and their biophysical environment, which includes both living organisms and non-living components. Topics of interest include biodiversity, distribution, biomass, and populations, as well as cooperation and competition within and between species. Ecosystems are the dynamic interaction between systems of living organisms, the communities that make them up, and the non-living components of their environment. Ecosystem processes, such as primary production, soil formation, nutrient cycling, and habitat building, regulate the flow of energy and materials through an environment. These processes are supported by organisms with specific life history traits			

Module 10

Code	Course/Module Title	ECTS	Semester
MSLA 111	Marine law	3	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2		32	43
Description			
This article includes defining the maritime law in terms of its subject matter, characteristics, history and sources, and then studying the legal nature of the ship. Marine accidents such as collision,			

salvage, loss and generality, and then study marine insurance.

Module 11

Code	Course/Module Title	ECTS	Semester
UBSP 112	Sport	3	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2		32	43
Description			
Basic equipment - ear and sinuses - blood circulation and breathing - suffocation and drowning - stress, protective clothing - auxiliary equipment and survival devices - nature of gases - Archimedes' rule - pneumatic cylinder bases - survival clothing and buoyancy equipment - pulmonary explosion and emergency ascent - decompression and prophylaxis - nitrogen anesthesia - carbon dioxide and monoxide poisoning - oxygen poisoning.			

Module 12

Code	Course/Module Title	ECTS	Semester
MSMT 110	Mathematics	4	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	62	38
Description			
Fundamentals of mathematics is a term sometimes used in some fields of mathematics, such as logic **Mathematics, axiomatic set theory, proof theory, model theory, pattern theory and recursion theory.** **The investigation of the foundations of mathematics is at the same time the central question in the philosophy of mathematics: What is the absolute rule on which mathematical statements remain true?**			

Module 13

Code	Course/Module Title	ECTS	Semester
MSSU 204	Surveying	6	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	62	88
Description			

Introducing the basics of surveying and knowing how to drop a building or survey a specific area, how to level and adjust, and the properties of horizontal and vertical angles. 2. Identifying contour maps and types of surveys and linking them to contemporary technology and using new bases for surveying.

Module 14

Code	Course/Module Title	ECTS	Semester
NAMA 206	Introduction of algae	6	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	2	77	88
Description			
Algae , morphological appearence - to reproduce - and the division of each section on the study alone - the relationship between the algae and other organisms - the economic importance of algae - the distribution of algae in different environments (snow - lake - river - pond freshwater - semi-saline water - the sea - the ocean) - benthic algae and plankton - chemical agents, natural and biological, which affect the distribution of algae and their proliferation			

Module 15

Code	Course/Module Title	ECTS	Semester
NAMA 207	Microbiology	4	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	38	62
Description			
The branch aims to provide the necessary information to understand the subject of basic biological sciences for pathogenic organisms (germs, viruses, fungi, immunity, and parasites) and to understand the mechanism of their spread and pathogens. In addition to theoretical information, the branch is keen to provide students with laboratory techniques related to microbiology			

Module 16

Code	Course/Module Title	ECTS	Semester
MSME209	Marine ecology	5	3
Class 6hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	62	63

Description
With all that it includes of living organisms under physical and climatic conditions, as well as the relationship between living organisms with each other and their interaction with the physical conditions surrounding them." The marine ecosystem is one of the most complex environmental systems. Marine ecology is defined as the science that is concerned with all

Module 17

Code	Course/Module Title	ECTS	Semester
NAMA 213	Invertebrate	6	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	2	77	73
Description			
Invertebrates are a paraphyletic group of animals that neither possess nor develop a vertebral column (commonly known as a backbone or spine), derived from the notochord. This is a grouping including all animals apart from the chordate subphylum Vertebrata. Familiar examples of invertebrates include arthropods, mollusks, annelids, echinoderms and cnidarians. The majority of animal species are invertebrates; one estimate puts the figure at 97%.[1] Many invertebrate taxa have a greater number and variety of species than the entire subphylum of Vertebrata.[2] Invertebrates vary widely in size, from 50 µm (0.002 in) rotifers[3] to the 9–10 m (30–33 ft) colossal squid. Some so-called invertebrates, such as the Tunicata and Cephalochordata, are more closely related to vertebrates than to other invertebrates.			

Module 18

Code	Course/Module Title	ECTS	Semester
NAMA 214	Biostatistics	3	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	1	32	43
Description			
Statistics is the study of collecting, analyzing, interpreting, presenting and organizing data in a specific way. Mathematical methods used in various analyzes include mathematical analysis, linear algebra, stochastic analysis, measure theoretical probability theory, and differential equation. Biostatistics (or biometrics) deals with statistical processes and methods applied to the analysis of biological phenomena. Biostatistics involves the design of biological experiments and the interpretation, collection, summarization, and analysis of data from those experiments. The ability to analyze and interpret statistical data is a vital skill for researchers and professionals from a variety of disciplines. You may need to make decisions on the basis of statistical data, interpret statistical data in research papers, conduct your own research, and interpret data.			

Module 19

Code	Course/Module Title	ECTS	Semester
NAMA 208	Animal taxonomy	6	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	62	88
Description			
Animal kingdom classification is an important system for understanding how all living organisms are related. Based on the Linnaeus method, species are arranged and grouped based on shared characteristics. This system of animal kingdom classification was developed by Swedish botanist Carolus (Carl) Linnaeus in the 1700 s. The Linnaeus Method, also known as Linnaean Taxonomy, creates a hierarchy of groupings called taxa, as well as binomial nomenclature that gives each animal species a two-word scientific name.			

Module 20

Code	Course/Module Title	ECTS	Semester
NAMA 209	Fundamental of Ichthyology	5	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	62	113
Description			
The student has a thorough understanding of ichthyology, including its groups, divisions, evolution, external shape, and internal anatomy, as well as studying methods of reproduction, fertility, egg development, mating and reproduction techniques, artificial hatching, methods for collecting samples of eggs and fish to conduct age and growth studies and studying fish environments, their geographic distribution, and behavior. The study of fish nutrition, food, variables influencing it, digestion, and metabolism, as well as the study of the circulatory system, sensory organs, buoyancy, osmotic control, and its processes, as well as fish breeding and production, are some of the goals of this course.			

Module 21

Code	Course/Module Title	ECTS	Semester
MSMC 211	Marine chemistry	6	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	62	88

Description
Chemical and physical properties of the pure water molecule - - The effect of salinity on the chemical and physical properties of the two water molecules - Interactions between ions in sea water - Acid and base reactions - Complex reactions - Redox reactions - Dissolved gases.

Module 22

Code	Course/Module Title	ECTS	Semester
MSEP 212	Environmental pollution	6	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	62	88
Description			
Defining pollution and studying the types of marine pollutants, including a brief overview of: their sources and fate, management and control, their impact on marine organisms and their dangers to humans.			

Module 23

Code	Course/Module Title	ECTS	Semester
UBDH 201	Democracy	4	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	62	68
Description			
Increasing the student's knowledge of the theoretical conceptual side and the historical development of human rights and democracy Developing the student's analytical and critical skills regarding the reality and future of human rights and democracy - Training students on the importance of active participation in aspects of public life, such as promoting respect for general human rights principles and active participation in political and cultural life. Enabling students to understand the importance of education and its role in spreading the culture of human rights and democracy in building a civilized society based on good governance, the most important of which is faith in human rights and education on them and active participation in governance through free and fair elections			

Module 24

Code	Course/Module Title	ECTS	Semester
MSME 205	Meteorology	3	4
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2		17	58
Description			
It studies different scales to determine how local, regional, and global systems affect weather and climate. meteorology, climatology, atmospheric physics,...			

Module 25

Code	Course/Module Title	ECTS	Semester
MSSW 301	Swimming and diving	4	5
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	62	38
Description			
Basic equipment - ear and sinuses - blood circulation and breathing - suffocation and drowning - stress protective clothing - auxiliary equipment and survival devices - nature of gases - Archimedes' rule - pneumatic cylinder bases - survival clothing and buoyancy equipment - pulmonary explosion and emergency ascent - decompression and prophylaxis - nitrogen anesthesia Carbon dioxide and monoxide poisoning - Oxygen poisoning.			

Module 26

Code	Course/Module Title	ECTS	Semester
NAMA 304	Animal physiology	6	5
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	77	73
Description			
An important characteristic of animals is the ability to self-regulate the extracellular environment in which their cells are bathed and function. The extracellular environment is a buffer between the intracellular environment and the external environment of an animal, which consists of an aquatic or terrestrial environment in exchange with the atmosphere. These external environments can be highly variable with respect to their physical characteristics, which would affect the intracellular physiological processes necessary for animals to function. Therefore, some aspects of the intracellular environment of an animal are invariably kept different from their external environment.			

Module 27

Code	Course/Module Title	ECTS	Semester
NAMA 305	Systematic of ichthyology	6	5
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	62	88
Description			
The student has a thorough understanding of ichthyology, including its groups, divisions, evolution, external shape, and internal anatomy, as well as studying methods of reproduction, fertility, egg development, mating and reproduction techniques, artificial hatching, methods for collecting samples of eggs and fish to conduct age and growth studies and studying fish environments, their geographic distribution, and behavior. The study of fish nutrition, food, variables influencing it, digestion, and metabolism, as well as the study of the circulatory system, sensory organs, buoyancy, osmotic control, and its processes, as well as fish breeding and production, are some of the goals of this course.			

Module 28

Code	Course/Module Title	ECTS	Semester
NAMA 307	Marine fisheries	6	5
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	62	88
Description			
Familiarity with knowledge of the rules and foundations for dividing fisheries, their types and sources, factors affecting them, mechanisms for regulating and managing fisheries, and problems that may affect those handling their management, and familiarity with the methods of fishing and marine life to ensure the highest rates of catch while preserving fish stocks. It also improves the student's ability to self-study, analyze and develop communication with scientists and specialists in the same scientific field.			

Module 29

Code	Course/Module Title	ECTS	Semester
NAMA 309	Wealth and marine res.	4	5
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2		32	38
Description			
Marine resources are all marine resources, and they are either biological (fish, algae, marine animals, plankton...) or energy (oil, natural gas, coal), or various minerals.... The world's marine resources suffer from several obstacles, most notably:			

Excessive exploitation of fish resources by marine fishing **Causing severe damage in the middle of the sea due to the influence of various factors such as the use of fishing mechanisms, collecting algae and sea snails, uprooting sand and throwing various chemical pollutants directly into the sea water.** **Dangers of oil tanker accidents**

Module 30

Code	Course/Module Title	ECTS	Semester
MSRW 317	Scientific research writing	4	5
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2		47	53
Description			
Scientific research methodology is the path that the researcher will take in collecting and arranging information within his study according to the requirements of the study and the nature of the information. They are used in the theoretical framework.			

Module 31

Code	Course/Module Title	ECTS	Semester
MSFE311	Environmental of fresh and estuaries	5	6
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	62	63
Description			
Studying the science of fresh and estuary waters and environmental factors affecting living organisms in the watery ocean **- Explain the effects of the environment on the living organism and its interaction with it and its activity according to changes in environmental factors** **It aims to identify the components of the aquatic ecosystem, the importance of the aquatic environment and its uses, study the physical, chemical and biological properties of water, identify the types of moving and static aquatic environments, study the types of outfalls and the factors affecting their physical and chemical characteristics.**			

Module 32

Code	Course/Module Title	ECTS	Semester
NAMA 312	Biodiversity	6	6
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**

2	2	62	88
Description			
The biological diversity of life on earth is the foundation of human existence and well-being. Biodiversity and viable ecosystems protect us from natural disasters, regulate the climate, and provide food, fertile soil, and medicine. But biodiversity is declining and many of the world's greatest biodiversity hotspots are located in countries burdened by poverty, food insecurity, and intensifying climate change. These underlying drivers of biodiversity loss are a result of unsustainable human activity and behavior. To protect biodiversity – and the prosperity of communities around the world – we must adopt and spur demand for more responsible and sustainable practices that safeguard soil, water, forests, and wildlife.			

Module 33

Code	Course/Module Title	ECTS	Semester
NAMA 306	Management of coastal marine	5	6
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	62	63
Description			
Understanding the environment of coastal zones - the economic role of coastal zones - pressures on coastal zones - human-caused changes in coastal zones - estimating the reactions in coastal zones - the urgent need and desired benefit of integrated coastal zone management - coastal zone planning with environmental sensitivity - sustainable development of the coast.			

Module 34

Code	Course/Module Title	ECTS	Semester
MSOP 308	Oil pollution	5	6
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	62	63
Description			
Knowledge and understanding of pollutants and oil pollutants, methods of treatment, design of treatment units, control and control of treatment units Measuring pollutants, diagnosing pollution and pollutants, and knowing their environmental and health risks			

Module 35

Code	Course/Module Title	ECTS	Semester

MSBC 310	Biochemistry	5	6
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	62	63
Description			
Photochemical reactions - The effect of the marine environment on photochemical reactions - Mutation in the metabolism (representation of carbohydrates, lipids and proteins) in marine animals - Biochemical changes associated with diving - Mutation of food in the absence of oxygen - Biochemical sensing in marine animals - The effect of the marine environment on the functioning of hormones - Adaptation Marine biology with estuarine waters - the structure and composition of calcareous tissues in marine biology and its relationship to calcium metabolism.			

Module 36

Code	Course/Module Title	ECTS	Semester
NAMA 315	Environmental toxicology	4	6
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	1	47	53
Description			
The environmental toxicology course aims to introduce students to the basics of toxicology, with a focus on organisms' influence and response. Describe and define biotoxins, chemical, xenobiotic mechanisms and natural toxins that interact with the biosphere, including humans. Mechanisms of the movement of toxic substances through soil, water and air, and the development of procedures to reduce pollution and purify polluted areas. The effect of different doses and concentrations of environmental toxins, their distribution, and their absorption on the toxicity of these substances.			

Module 37

Code	Course/Module Title	ECTS	Semester
NAMA 401	Aquatic pathology	6	8
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	62	88
Description			
Pathology and Epidemiology of Aquatic Animal Diseases for Practitioners provides information on the diseases and applied epidemiology of all aquatic animal taxa, including invertebrates and vertebrates, along with information on applied epidemiology, acknowledging the One Health concept, and discussion on probabilities of disease outbreaks occurring and assesses the economic costs of treating those outbreaks, if applicable. Divided into two sections, looks at the pathology of major aquatic taxa and their associated			

infectious diseases—parasitic, viral, and bacterial—and non-infectious diseases. Each includes an overview, their host range and transmission, signs and diagnosis, differentials, and treatment and management...

Module 38

Code	Course/Module Title	ECTS	Semester
NAMA 403	Fish culture	6	7
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	62	88
Description			
The student learns how to choose the location of the fish ponds, how to set them up and equip them, and about the tools and equipment used for this purpose. They also learn how to choose the fish types that can be raised in the fish ponds and be of high productivity and how to provide them promptly and at a reasonable cost, as well as how to care for the fish in the fish ponds so that they give the greatest productivity during a specific period, as well.			

Module 39

Code	Course/Module Title	ECTS	Semester
NAMA 405	Biotechnology	5	7
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	62	63
Description			
This course includes a study of the definition and applications of biotechnology and genetic engineering and acquaints the student with some of the tools used in the field of biotechnology, such as how recombinant DNA works, in addition to a broad look at the applications of biotechnology in medicine, pharmacy, industry, agriculture and the environment.			

Module 40

Code	Course/Module Title	ECTS	Semester
NAMA 407	Plankton	6	7
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	2	77	73
Description			

Identifying phytoplankton and zooplankton, their types, classification, environmental and economic importance, as well as their distribution in the environment and the environmental factors affecting them. As well as methods for measuring the productivity of plankton

Module 41

Code	Course/Module Title	ECTS	Semester
NAMA 409	Graduation project	3	7
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	62	13
Description			
This course focuses on the student studying a problem in the field of work, a research and theoretical study, and finding appropriate solutions and treatments for it			

Module 42

Code	Course/Module Title	ECTS	Semester
MSNT 421	Nanotechnology	4	7
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	1	32	68
Description			
Nanotechnology is the manipulation of matter on a near-atomic scale to produce new structures, materials and devices. The technology promises scientific advancement in many sectors such as medicine, consumer products, energy, materials and manufacturing. The marine industry benefits from various technological advances driven by progress in nanoscale science and development. Nanotechnology permeates much of the world's economy today, and one of the earliest capillary systems for the globalized flow of goods – the worldwide network of ports, ships, and shipping routes in the marine industry – is using it extensively.			

Module 43

Code	Course/Module Title	ECTS	Semester
NAMA 402	Marine benthic	6	8
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**

2	2	62	8
Description			
Animals that live on the sea floor are called benthos. Most of these animals lack a backbone and are called invertebrates. Typical benthic invertebrates include sea anemones, sponges, corals, sea stars, sea urchins, worms, bivalves, crabs, and many more. Recent research indicates that the diversity of species living in the deep-sea may rival the species richness found in tropical coral reefs! At first, scientists found this puzzling because we believed that few lifeforms could withstand the harsh, deep regions of the oceans. However, now we know that marine benthic organisms are well adapted to their environment and can live and thrive even in the cold dark waters of the deep sea.			

Module 44

Code	Course/Module Title	ECTS	Semester
NAMA 404	Biology productivity	6	8
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	62	88
Description			
The concept may apply to a single organism, a population, or entire communities and ecosystems. In aquatic systems, productivity is often measured in volume instead of area. The quantity of organic matter or its equivalent in dry matter, carbon, or energy content which is accumulated per area during a given period of time. Bioproductivity is the coordinated manifestation of the efficiency with which biological processes operate at various organization scales, from molecular/cellular to the whole organism and population.			

Module 45

Code	Course/Module Title	ECTS	Semester
NAMA 406	Wetland	6	8
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	62	88
Description			
the student muste have a complete perception for about the importance of wetlands in the world and in Iraq in particular GOALS AND OBJECTIVES -Main definitions of wetlands. -Major local and global classifications and divisions of wetlands. -Benefits of wetlands. -Components of wetlands.			

- Hydrological systems in different types of wetlands. -The role of biota in wetlands -More about sea water

Module 46

Code	Course/Module Title	ECTS	Semester
NAMA 416	Climate changes	3	8
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	62	13
Description			
Identifying the components and importance of the atmosphere, identifying the elements of weather and climate, the causes of climate change, and how to treat and control the most important causes of climate change.			

Module 47

Code	Course/Module Title	ECTS	Semester
NAMA 419	Tide	4	8
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2		32	43
Description			
To learn about how it occurs, its types, the reasons for its occurrence, the extent of its danger, and its benefits, to make the best use of it			

Module 48

Code	Course/Module Title	ECTS	Semester
MSPM 420	Port management	5	8
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	62	88
Description			
This course gives a general idea of the total port and maritime transport activities. It also informs managers operating within a defined area of the port how their particular responsibilities fit into the operational and commercial group of the complex maritime transport interface. This program			

explains what a port is, what its various, variable and evolving functions are, and how it works. It introduces key concepts and analyzes the different types of ports and explains how they have evolved and changed, and the effects that ship technology has had on them.