

الخطة الدراسية لقسم الأحياء البحرية:

المستوى الأول:

ت	اسم المساق	رمز المساق	الساعات المعتمدة	نوع المساق
1.	لغة عربية 1	عرب 111	2	متطلب جامعة
2.	لغة انجليزية 1	انج 112	2	متطلب جامعة
3.	مقدمة حاسوب	كمب 113	3	متطلب جامعة
4.	بيولوجيا عامة	بيو 114	3	متطلب كلية
5.	رياضيات	رياض 115	3	متطلب كلية
6.	فيزياء عامة	فيز 116	3	متطلب كلية
إجمالي الساعات المعتمدة			16	

المستوى الأول:

ت	اسم المساق	رمز المساق	الساعات المعتمدة	نوع المساق
1.	لغة عربية 2	عرب 121	2	متطلب جامعة
2.	لغة انجليزية 2	انج 122	2	متطلب جامعة
3.	تطبيقات حاسوب	عاس 123	3	متطلب كلية
4.	أسس علوم البيئة	عاس 124	2	متطلب كلية
5.	كيمياء تحليلية	كيم 125	3	متطلب كلية
6.	جيولوجيا عامة	عاس 126	3	متطلب قسم
إجمالي الساعات المعتمدة			15	

**المستوى الثاني:**

**الفصل الدراسي الأول:**

ت	اسم المساق	رمز المساق	الساعات المعتمدة	نوع المساق
1.	ارصاد	عاس 211	3	متطلب كلية
2.	مناهج بحث علمي	عاس 216	2	متطلب كلية
3.	ميكروبيولوجي	بيو 213	3	متطلب قسم
4.	أسس علم الأسماك	بحرية 214	3	متطلب قسم
5.	علم المحيطات	بحرية 215	3	متطلب قسم
6.	ثقافة اسلامية1	ثق 218	2	متطلب قسم
<b>إجمالي الساعات المعتمدة</b>			<b>16</b>	

**المستوى الثاني:**

**الفصل الدراسي الثاني:**

ت	اسم المساق	رمز المساق	الساعات المعتمدة	نوع المساق
1.	كيمياء عضوية	كيم 221	3	متطلب كلية
2.	أحصاء حيوي وتصميم تجارب	عاس 222	3	متطلب كلية
3.	ملاحة وارصاد بحري	بحرية 223	3	متطلب قسم
4.	بيولوجية الخلية والانسجة	بحرية 224	3	متطلب قسم
5.	بيئة بحرية	بحرية 316	3	متطلب قسم
6.	ثقافة اسلامية2	ثق 228	2	متطلب قسم
<b>إجمالي الساعات المعتمدة</b>			<b>17</b>	

**المستوى الثالث:**

**الفصل الدراسي الأول:**

ت	اسم المساق	رمز المساق	الساعات المعتمدة	نوع المساق
1.	تنوع حيوي	بحرية 327	2	متطلب قسم
2.	سباحة وغوص	بحرية 312	3	متطلب قسم
3.	اللافقاريات بحرية	بحرية 313	3	متطلب قسم
4.	فسلجة كائنات بحرية	بحرية 314	3	متطلب قسم
5.	بيولوجية الاسماك	بحرية 315	3	متطلب قسم
6.	نباتات بحرية	بحرية 226	3	متطلب قسم
7.	بيولوجية البحار والمحيطات	بحرية 327	3	متطلب قسم
إجمالي الساعات المعتمدة			20	

**المستوى الثالث:**

**الفصل الدراسي الثاني:**

ت	اسم المساق	رمز المساق	الساعات المعتمدة	نوع المساق
1.	وراثة متقدمة	بحرية 321	3	متطلب قسم
2.	تصنيف اسماك	بحرية 322	3	متطلب قسم
3.	تحليل آلي	عاس 323	3	متطلب كلية
4.	الثدييات البحرية والسلاحف	بحرية 324	3	متطلب قسم
5.	تغذية اسماك	بحرية 325	3	متطلب قسم
6.	اقتصاديات الثروة السمكية	بحرية 226	2	متطلب قسم
7.	بيولوجيا بحرية	بيو 312	3	متطلب قسم

20	إجمالي الساعات المعتمدة
15	تدريب صيفي

**المستوى الرابع:** الفصل الدراسي الأول:

ت	اسم المساق	رمز المساق	الساعات المعتمدة	نوع المساق
1.	الاعشاب البحرية	بحرية 411	3	متطلب قسم
2.	إدارة السواحل	بحرية 412	2	متطلب قسم
3.	الشعاب المرجانية واسماك الزينة	بحرية 424	3	متطلب قسم
4.	امراض وصحة الاسماك	بحرية 414	3	متطلب قسم
5.	تداول وحفظ الاسماك	بحرية 415	3	متطلب قسم
6.	مشروع بحث 1	بحرية 426	1	متطلب قسم
			<b>15</b>	
		<b>إجمالي الساعات المعتمدة</b>		

**المستوى الرابع:** الفصل الدراسي الثاني:

ت	اسم المساق	رمز المساق	الساعات المعتمدة	نوع المساق
1.	التقنية الحيوية	بحرية 421	3	متطلب قسم
2.	اللغة الانجليزية للبيولوجيين	بحرية 422	2	متطلب قسم
3.	تكنولوجيا الاسماك	بحرية 423	3	متطلب قسم
4.	سلوك حيوان بحري	بحرية 413	2	متطلب قسم
5.	ديناميكية وإدارة الاسماك	بحرية 425	3	متطلب قسم
6.	مشروع بحث 2	بحرية 426	1	متطلب قسم

### وصف المساقات الدراسية لقسم الأحياء البحرية:

المقرر: لغة عربية 1 - المستوى الأول - الفصل الدراسي الأول - الساعات الأسبوعية ساعتان.

وصف المقرر: يتناول هذا المقرر أقسام الكلمة والأحكام الإعرابية المتعلقة بالأسماء والأفعال وعلامات إعرابها الأصلية والفرعية وكذلك الأحكام الإعرابية المتعلقة بالمبتدأ والخبر والأفعال والحروف الناسخة وبعض القواعد الكتابية ، إضافة إلى تحليل النصوص المختلفة وجملة من التطبيقات اللغوية (عملية وأدائية) ، سعياً إلى تنمية القدرة اللغوية والبلاغية لدى الطلبة وتعميق قدراتهم على ممارسة المهارات النحوية والكتابية وتطبيقها في حياتهم العملية.

المقرر: لغة إنجليزية 1 - المستوى الأول - الفصل الدراسي الأول - الساعات الأسبوعية ساعتان.

Course Description: This course emphasizes the role of English in the study of Science. It's topics focus on the basic grammatical structures and language functions needed for the study of and communication in this field. It is taught for three hours per week in the first semester of the B. Sc. programmers in Faculties of Agricultural Sciences, Oil and Minerals, and scientific programmers of Faculty of Education. It is intended to provide a solid formation in the English language skills as well as the study skills needed by the students in their specialist studies. It covers a wide range of scientific subjects, common grammatical structures, specialist vocabulary and basic language functions.

المقرر: مقدمة حاسوب - المستوى الأول - الفصل الدراسي الثاني - الساعات الأسبوعية ثلاث ساعات.

Course Description: This course provides a student by basic and advanced skills for using computer at studying environment, library, and at home. It presents the knowledge of basic computing concepts. The course provides the knowledge needed to operate and utilize the operating system and office software package, and to use the computer for Internet access and electronic communication.

المقرر: بيولوجيا عامة - المستوى الأول - الفصل الدراسي الأول - الساعات الأسبوعية ثلاث ساعات.

**Course Description:** General Biology is an essential Faculty requirement, this course include an introduction to knowledge of general biology and life properties, chemistry of living matter and the structure of cell and their functions. It is also contains the foundations of knowledge of the biodiversity of living organisms, as well as the basic and principles of ecology, tissues, anatomy, physiology, genetics and molecular biology through theoretical lectures and laboratory works in order to prepare very qualified students that understand biology effectively, and to be a helper in the study of other coming courses like cytology, histology and physiology.

**المقرر:** الرياضيات - المستوى الأول - الفصل الدراسي الأول - الساعات الأسبوعية ثلاث ساعات.

**Course Description:** This course deals with a number of laws and basic concepts in mathematics as well as the study of real numbers and algebraic operations, linear and quadratic equations and inequalities and absolute value, and functions and their inverses and graphs in addition to the elementary functions and some related applications.

**المقرر:** الفيزياء العامة - المستوى الأول - الفصل الدراسي الأول - الساعات الأسبوعية ثلاث ساعات.

**Course Description:** This course covers the basic concepts in general physics. It starts with vectors and dynamics of bodies. Then the work, energy and power will be introduced. After that the circular motion, Fluids, Mechanical properties of matter will be studied. Finally, acoustic, temperature and heat will be covered. This course is a faculty requirement and compulsory for the students of first level, and essential for the other some courses in the next years like general geology, meteorology, marine meteorology, biological oceanography, general biology2, marine animal behaviors.

**المقرر:** لغة عربية2 - المستوى الأول - الفصل الدراسي الثاني - الساعات الأسبوعية ساعتان.

**وصف المقرر:** يتناول هذا المقرر الأحكام الإعرابية المتعلقة بالفاعل ونائب الفاعل والمفعولات والتوابع وكذلك الأحكام الإعرابية المتعلقة بأسلوبي النداء والشرط وبكتابة الأعداد وبعض من القواعد الكتابية المتعلقة بكتابة التلخيص والتقرير والرسالة ، فضلاً عن وتحليل النصوص وجملة من التطبيقات اللغوية المختلفة (عملية وأدائية) ، سعياً في تنمية القدرة اللغوية والبلاغية لدى الطلبة وتعميق قدراتهم على ممارسة المهارات النحوية والكتابية وتطبيق القواعد النحوية في حياتهم العملية.

**المقرر:** لغة إنجليزية2 - المستوى الأول - الفصل الدراسي الثاني - الساعات الأسبوعية ساعتان.

**Course Description:** This course emphasizes the role of English in the study of Science. It is taught for three hours per week in the second semester of the B. Sc. programmers in Faculties of Agricultural Sciences, Oil and Minerals, and scientific programmers of Faculty of Education. It reviews and enhances the vocabularies and grammatical structures acquired in General English for Science 1, and provide

students with additional and advanced grammatical structures and language functions needed for the study of and communication in this field. It is intended to provide opportunities to develop English language skills as well as the study skills needed by the students in their specialist studies. It covers a wide range of scientific subjects, advanced grammatical structures, specialist vocabulary and language functions.

**المقرر: تطبيقات حاسوب - المستوى الأول - الفصل الدراسي الثاني - الساعات الأسبوعية ثلاث ساعات.**

**Course Description:** This course deals with recent applications in the computer through a review of a range of application software and skills to deal with, as well as to explore the impact of technology in information management. Which gives the student the ability and skill in searching for information, particularly in relation to his specialty and how to manage, processing, archiving and retrieval, as well as skills in searching and browsing the World Wide Web. This course will also address methods of preparing a digital reports and basic concepts of electronic spreadsheets, database, and ways of organizing, control and retrieve data. Through theoretical lectures and practical applications.

**المقرر: أساسيات علوم البيئة - المستوى الأول - الفصل الدراسي الثاني - الساعات الأسبوعية ساعتان.**

**وصف المقرر:** سيركز المقرر على المفاهيم الأساسية لعلم البيئة ومجالاته , نشأته ومراحل تطوره ، علاقته بالعلوم الأخرى ، وأساسيات النظام البيئي ، مفهوم المجموعات الحيوية والعلاقات الإيجابية والسلبية التي تؤثر في توزيع الكائنات ، أنواع البيئات الحيوية في اليابسة والمسطحات المائية ومكوناتها الحية وغير حية ، وآليات تدفق الغذاء عبر النظام الحيوي ، إضافة للعلاقات الغذائية ، السلاسل الغذائية والشبكات الغذائية ومستويات التغذية ، الدورات البيوجيوكيميائية ، والإنتاجية البيئية.

**المقرر: كيمياء تحليلية - المستوى الثاني - الفصل الدراسي الأول - الساعات الأسبوعية ثلاث ساعات.**

**Course Description:** This course deals with a set of concepts and topics including the concept of analytical chemistry and its importance and what characterize it from other science branches, the course also deals with reactions types in quantitative and volumetric analysis, preparation and standardize some of standard solutions and to identify indicators and their theories, perform some neutralization, oxidation reduction, precipitation and complex formation titrations reactions, calculations and methods of expressing concentration and methods of separation and purification that enabling the student to identify the most important concepts and theories in analytical chemistry and possess the ability to conduct and interpret the results of practical experiments that the course deals with. Analytical chemistry falls within the compulsory department requirements especially it represents the basis for the course instrumental analysis in the second level.

**المقرر: جيولوجيا عامة - المستوى الأول - الفصل الدراسي الثاني - الساعات الأسبوعية ثلاث ساعات.**

**وصف المقرر:** سيركز المقرر على المفاهيم الأساسية لعلم الجيولوجيا ، نشأة الأرض وموقعها في المجموعة الشمسية تركيبها وشكلها ومكوناتها المعدنية والصخرية المختلفة. ويتطرق المقرر إلى الجيولوجيا البحرية مشتملة تضاريس وتركيب قيعان البحار والمحيطات مع التركيز على جيولوجية البحر الأحمر ، وخليج عدن وبحر العرب ، كما سيتناول المقرر الحركات الأرضية للصفائح التكتونية وما ينتج عنها من ظواهر طبيعية مثل الزلازل والبراكين التي تحدث في البيئات البرية والبحرية. وسيُمكن المقرر الطالب من استخدام الوسائل الجيولوجية المختلفة.

**المقرر:** أرساد عام - المستوى الثاني - الفصل الدراسي الأول - الساعات الأسبوعية ثلاث ساعات.

**وصف المقرر:** سيركز المقرر على المفاهيم الأساسية للغلاف الجوي ، مكونات الغلاف الجوي ، الاشعاع الشمسي ، الطاقة الناتجة من الاشعاع الشمسي ، توزيع الطاقة على سطح الارض ، الحرارة ، الضغط الجوي ، الرطوبة ، التكاثف ، أنواع التساقط ، الرياح ، الكتل الهوائية ، الجبهات الهوائية ، السحب ، المنخفضات والمرتفعات الجوية ، المناخ العالمي ، تصنيف وتوزيع الاقاليم المناخية.

**المقرر:** أسس بحث علمي - المستوى الثاني - الفصل الدراسي الأول - الساعات الأسبوعية ساعتان.

**Course Description:** This course aims to equip students with the basic concepts of scientific research methods and the techniques, and find out the different types of scientific research and to identify the components of the research plan and the ability to understand the plan and design a research plan in the field of specialization and the acquisition of student skills in documenting information and its different sources.

**المقرر:** ميكروبيولوجي - المستوى الثاني - الفصل الدراسي الأول - الساعات الأسبوعية ثلاث ساعات.

**Course Description:** Microbiology is an essential Faculty requirement. This course intends to introduce students to the study of marine microbial world, to metabolic and physiological features of the main taxonomic groups of marine microorganisms and their distribution. It proposes to emphasize the role of microbes in marine ecosystem and to characterize interactions between particular microbial species and the environment or other marine organisms. The course also provides students with knowledge about the microorganisms that cause diseases and their immunity and information about the main methods used in marine microbial communities' studies and in bacterial detection from sea-water samples.

**المقرر:** أسس علم الأسماك - المستوى الثاني - الفصل الدراسي الأول - الساعات الأسبوعية ثلاث ساعات.

**Course Description:** This course provides students with an overview of the fish concept as specific aquatic vertebrate. It covers the basics of the fish external morphology, internal anatomy, classification and geographical distribution throughout the oceans, seas and freshwater basins. It provides an account of fish

ecology, senses and behaviors, food and feeding habits, reproduction and migration. This course will review the major groups of fishes. Special attention will be given to fishes found in the Indian Ocean and Yemeni coasts. As a field and laboratory course, student will be given a hand-on experience in the collection, preservation, identification, anatomy, and morphology of fishes found in Yemeni coasts. Laboratory exercises will provide additional opportunities to study natural history of fish.

**المقرر: علم المحيطات - المستوى الثاني - الفصل الدراسي الأول - الساعات الأسبوعية ثلاث ساعات.**

**Course Description:** This course introduces fundamental concepts on oceanography and its relations with basic sciences. The subject will define the categories of ocean topography and the importance of continental shelves and the abyssal plain of the oceans. It will include classifications of marine environments, physical and chemical properties of sea waters (temperature exchange, currents, tides, currents, salinity, nutrients, dissolved gases etc.). It will also introduce and categorize major groups of marine organisms (planktons, benthos and nektons) and its habitats. Define and classify marine algae, plants and corals (major groups and habitats) and its relations with primary productivity in the oceans. The course will introduce categories of sedimentation and food resources in the oceans (e.g. Indian oceans). Students will study basic knowledge on the topography, environmental parameters and climatic conditions in the Arabian sea and the gulf of Aden.

**المقرر: الثقافة الإسلامية 1 - المستوى الثاني - الفصل الدراسي الأول - الساعات الأسبوعية ساعتان.**

**وصف المقرر:** يتناول هذا المقرر مناقشة المفاهيم المتعلقة بالثقافة الإسلامية ، وأهم المفاهيم المرتبطة بها ، وأبرز التحديات الثقافية المعاصرة التي تواجهها ، وبيان التصور الإسلامي للإله للكون والإنسان والحياة ، وطبيعة الحضارة الإسلامية مع التركيز على أهم القضايا والمبادئ الحقوقية المعاصرة ، وغرس قيم التسامح والحوار ، ونبذ الغلو والتطرف ، من أجل تكوين شخصية مسلمة وسطية معتدلة.

**المقرر: كيمياء عضوية - المستوى الثاني - الفصل الدراسي الثاني - الساعات الأسبوعية ثلاث ساعات.**

**Course Description:** This course deals with a set of concepts and topics about organic chemistry which is the study of carbon compounds and its importance to life sciences since all living organisms consist of organic molecules. The course introduces the student to various functional groups and the different reaction types of such functional groups. The course covers in a simplified fashion the chemistry of hydrocarbons (alkenes, alkynes, and aromatic compounds and cycloalkanes), alcohols and ethers, phenols, alkyl halides, aldehydes, ketones, carboxylic acids and their derivatives, and amines. Isomerism is an important concept in organic chemistry which have vital impact in the biochemistry of living organism. The student will be introduced to such concept in a simplified way.

المقرر: إحصاء حيوي وتصميم التجارب - المستوى الثاني - الفصل الدراسي الثاني - الساعات الأسبوعية  
ثلاث ساعات.

**Course Description:** This course deals with the importance of design and analysis of scientific experiments. It covers the design of laboratory experiments and field experiments, hypothesis probability, analysis of variances, the random complete design and random complete block design.

المقرر: ملاحظة وارصاد بحري - المستوى الثاني - الفصل الدراسي الثاني - الساعات الأسبوعية ثلاث ساعات.

**Course Description:** This course focuses on the basic principles of marine meteorology, characteristics of weather systems and elements, atmospheric observations, measurements and instruments, wind speed and direction, tropical cyclones, sea ice, weather services for trade ships, radar will be studied. The course covers also main concepts of marine navigation, Earth's shape, celestial navigation system, coordinates system. It provide students with modern techniques in marine navigation and methods of data acquiring and computer processing will be covered.

المقرر: بيولوجية الخلية والانسجة - المستوى الثاني - الفصل الدراسي الثاني - الساعات الأسبوعية ثلاث ساعات.

**Course Description:** This Course introduces the basic knowledge of cells , tissues and organ-system, describes structures and functions and improves practical skills that lead to identifying and comparing different types of cells and tissues within organs of animal , specially marine organisms.

المقرر: البيئة البحرية - المستوى الثاني - الفصل الدراسي الثاني - الساعات الأسبوعية ثلاث ساعات.

**Course Description:** The course introduces the basic concepts of the marine environment, its characteristics, ecosystem components (biotic and abiotic) and the relationships between marine organisms and their environment. Study of other components in the marine ecosystem such as nutrient cycles, energy flow and trophic levels. The communities on the continental shelf will be characterized and main groups of organisms in the marine environment (Plankton, Benthos - Nekton and bacteria) and their habitats well be identified . The course well identifies the coral reefs and their environment and their relationship with the living coexist. Subdivisions of the marine environment and the factors affecting them as well as human impacts well be also studied.

المقرر: الثقافة الإسلامية 2 - المستوى الثاني - الفصل الدراسي الثاني - الساعات الأسبوعية ساعتان.

**وصف المقرر:** يتناول هذا المقرر مناقشة الفكر السياسي في الاسلام ، حقوق الإنسان في الإسلام ، الإنسان في الإسلام ، تصحيح بعض المفاهيم ، الفكر الاقتصادي الإسلامي ، رأي الدين في بعض القضايا ، التضامن والصحة الإسلامية.

**المقرر: التنوع الحيوي - المستوى الثالث - الفصل الدراسي الأول - الساعات الأسبوعية ساعتان.**

**Course Description:** The schedule will concentrate at the basic concepts of biodiversity and living communities and their importance; the species and speciation concept; types of biodiversity and bio – communities, principles of taxonomy and marine organisms naming; diversity in aquatic environments at the local and global levels, physical and environmental factors affecting the marine biodiversity, methods of biodiversity measuring; protected areas as a cornerstones of biodiversity conservation, their types and the behavior of animals in it; methods to protect marine biodiversity; the biodiversity of the Red Sea and the Gulf of Aden, the Conventions on Biological Diversity.

**المقرر: سباحة وغوص - المستوى الثالث - الفصل الدراسي الأول - الساعات الأسبوعية ثلاث ساعات.**

**Course Description:** This course will be provide an overview about swimming condition in sea water focusing on water physical characteristics, Archimedes principle, buoyancy, human ears and sinuses, circulation and respiration, human muscular physiology. Evaluate how to swim skillfully and safely. The course is to teach students rules and techniques of open system SCUBA diving equipment's, History of diving, Physics and chemistry of diving (Energy, pressure and gases), equipment's of scuba diving and their working process, underwater physiology, cardiovascular system, respiratory system and nervous system, Rules of diving safety. The course is including an introduction to basic training in various types of underwater work methods, rigging, and inspection. Along with more development of theory and techniques related to diving, this course will provide lectures and practical application of advanced diving techniques. Including; different decompression models, navigation, light salvage, night diving, nitrox use, and dry suit diving. How to use these diving skills in a subtidal research projects will be discussed and practiced.

**المقرر: اللافقاريات بحرية - المستوى الثالث - الفصل الدراسي الأول - الساعات الأسبوعية ثلاث ساعات.**

**Course Description:** This course will introduce students to recognize and understand the taxonomy and biology of the marine invertebrates, from the microscopic animals (Protozoa) up to worm's phyla, Metazoan. The course will contain biology and taxonomical patterns of marine invertebrates; Foraminifer, Radiolarians, Ciliates, Poriferans, Coelenterates, Ctenophores. Worm phyla; Platyhelminthes, Nematodes, Crustacean, Molluscan and Echinoderms, including examples representing each group describing their environment, external features,

internal structures, life cycles, vital systems ,and their economic importance. The course will explore adaptations of invertebrate to the marine environment and evolutionary patterns of diversity. Course includes also an extended field trip to one of the Hadhramout shore sites.

المقرر: فسلجة كائنات بحرية - المستوى الثالث - الفصل الدراسي الأول - الساعات الأسبوعية ثلاث ساعات.

**Course Description:** This course is designed to bring the student a general understanding the physiology of marine animals using a comparative approach, through the study of basic concepts and in-depth physiological adaptations included (thermoregulation, hypoxia, water and salt balance). The focus will be on how to adapt the various organs of the body systems (digestive, circulatory, excretory, nervous, muscular, skeletal, and hormonal) for the performance of physiological functions in the marine environment. The course would be covered through theoretical lectures and laboratory works.

المقرر: بيولوجية الاسماك - المستوى الثالث - الفصل الدراسي الأول - الساعات الأسبوعية ثلاث ساعات.

**Course Description:** The course focuses on the biology of fishes including, food and feeding ecology, reproduction, age and growth. The course emphasis will on the Gulf of Aden and Red Sea ichthyoid fauna with an emphasis on the fishes of Hadhramout coast, however, principles will also be drawn globally. Lab exercises will emphasize collection and processing methodology, identification, and comparative morphology.

المقرر: نباتات بحرية - المستوى الثالث - الفصل الدراسي الأول - الساعات الأسبوعية ثلاث ساعات.

**Course Description:** This course gives an overview, including local examples of the principal groups of marine microalgae, macro algae, and submerged aquatic and emergent marine flowering plants; with a primary focus on their identification and ecology. The lecture and field work for this course are interlaced so that, following the lecture material, field examination of the algae and plants are made. Field trips in the vicinity of Mukalla and to some neighboring beaches are made to observe algae and aquatic/emergent vegetation, the ecological relationships of these floras, and for collecting material for study in the laboratory.

المقرر: بيولوجيا البحار والمحيطات - المستوى الثالث - الفصل الدراسي الأول - الساعات الأسبوعية ثلاث ساعات.

**Course Description:** This course will include an introductory to biological oceanography and its relations to ocean logy and other sciences. The students will study the biological importance of some physical and chemical properties of sea waters and marine organisms and its classifications. The course will well introduce marine ecology and its biotic communities , the constitution of ecosystem and its main characters. It will also include studying marine planktons and benthos, its types,

environments and importance. The primary productivity will also studied as well as an introduction to fish biology and marine pollution.

المقرر: وراثة متقدم - المستوى الثالث - الفصل الدراسي الثاني - الساعات الأسبوعية ثلاث ساعات.

**Course Description:** The science of genetics deals with behavior and mechanisms of the inheritance in living organisms and it improves ability of the student to understand advanced concepts of the gene and genetic techniques. This course focus on use of laboratory genetics techniques and improve intellectual and professional ability of the student to conduct experiments on advance genetics issues and enhancement. This course is a department required course of marine biology program.

المقرر: تصنيف اسماك - المستوى الثالث - الفصل الدراسي الثاني - الساعات الأسبوعية ثلاث ساعات.

**Course Description:** With well over 28,000 species alive today, the world's fishes comprise by far the largest and most diverse of all vertebrate groups. This course provides an introduction to this incredible diversity and looks at how scientists study fishes. During lecture sessions, students will be introduced to the taxonomy, major groups, and general morphology. The laboratory portion of the course expands upon material presented in lecture, and offers hands-on experience learning about and identifying major orders, families, genera, and species of fishes, with particular emphasis on species occurring in Yemeni waters. Specifically, students will become familiar with fish morphology, will learn fish identification (emphasis on regional marine fishes), classification, taxonomy and fish systematic, and will be exposed to local aquatic habitats and their associated fish fauna. A study of the principles of taxonomy, nomenclature, classification and systematic incorporating the most recent approaches to derivation and application of hierarchical/ classification systems.

المقرر: تحليل آلي - المستوى الثالث - الفصل الدراسي الثاني - الساعات الأسبوعية ثلاث ساعات.

**Course Description:** This course will introduce students to the theoretical principles of instrumental methods of chemical analysis, including such topics as ultraviolet, visible spectrophotometry, atomic absorption and emission spectroscopy, the principles and applications associated with electrochemical methods of analysis and chromatographic techniques of separation such as gas and liquid chromatography. The course enabling the students a chance to know instruments used in chemical analysis, understand their properties, structure, the foundations as well as the factors that affect their work. The course will increase students abilities in using instruments for solving chemical problems qualitatively and quantitatively. Instrumental analysis falls within the compulsory program requirements.

المقرر: الثدييات البحرية والسلاحف - المستوى الثالث - الفصل الدراسي الثاني - الساعات الأسبوعية

ثلاث ساعات.

**Course Description:** The course includes the taxonomy of marine mammals and turtles, their occurrence, general description, morphology, identification of main genus and species. (Special attention will be focused on Red Sea and Arabian Sea species), geographical distribution, behavior and general biology. Adaptation to marine environments, and related topics including, conservation, protection and economic importance. The course Includes laboratory and field experience with the animals and with their habitat requirements.

**المقرر:** تغذية اسماك - المستوى الثالث - الفصل الدراسي الثاني - الساعات الأسبوعية ثلاث ساعات.

**Course Description:** This course covers the basic concepts in fish nutrition. It deals natural basic nutrients for fish, protein, lipid, carbohydrate, vitamin, minerals, the protein resources, diet preparation, diet manufacture, factors which effect on protein to fish growth, digestion system, absorption process, digestive enzymes, fertilizer and natural bloom food.

**المقرر:** اقتصاديات الثروة السمكية - المستوى الثالث - الفصل الدراسي الثاني - الساعات الأسبوعية ساعتان.

**Course Description:** Shows the basic concepts of economics and its objectives, and methods of analysis and study of the economic problem and its elements And its relationship to science, especially the fish economy and economic resources, deals with the fishing industry and their ratings and their importance in the national economy and the effectiveness of the use of factors of production fish, Fish and revenues and production processes springboard laws of supply and demand and prices, investment and marketing in accordance with state policies. Prices and effectiveness of investments fish and developed on the basis of the strategy and policies of the State investment, marketing, decision also shows the economic position of aquaculture in the world, and trade of fish and Arab world and the economic impacts of the management of marine resources and their impact on national income.

**المقرر:** بيولوجيا بحرية - المستوى الثالث - الفصل الدراسي الثاني - الساعات الأسبوعية ثلاث ساعات.

**Course Description:** This course is intended for Marine Biology and is designed to build student knowledge of marine organisms and environments in conjunction with lecture material. Laboratory activities are closely linked with class lectures and are designed to give students experiential knowledge and acquaint them with the regional marine fauna and flora.

**المقرر:** تدريب صيفي - المستوى الثالث - الفصل الدراسي الثاني - خمسة عشر ساعة.

**Course Description:** This course intended an applied field training which could be held at summer time after completing the third year of the study. Throughout approximately 3-4 weeks period, summer training is considered to strengthen the

practical capability of the under graduated students. It is documented to be occurred in different places related to fishery wealth and marine biology. Through the training period, students implement special tasks to gain applied skills in fishery and marine biology specialization, as well as effective communication with others and work with team.

**المقرر:** الاعشاب البحرية - المستوى الرابع - الفصل الدراسي الأول - الساعات الأسبوعية ثلاث ساعات.

**Course Description:** This course covers the basic concepts in Mari culture. It deals the water quality of Mari culture, the essential systems of Mari culture, natural and artificial reproduction of fish and shrimp, using hormones in artificial reproduction, hatchery processes of fish and shrimp and rearing juveniles.

**المقرر:** إدارة السواحل - المستوى الرابع - الفصل الدراسي الأول - الساعات الأسبوعية ساعتان.

**Course Description:** Course will focus on basic concepts and methods of coastal management, types of coastal ecosystems, their uses, human impacts on ecosystems, coastal resources and their importance to the environment, planning methods, environmental impact assessment for coastal zone, sustainable development, laws and legislations related to coastal zones. Student will be provided with basic applications of geographic information systems (GIS) for coastal zone management.

**المقرر:** الشعاب المرجانية واسماك الزينة - المستوى الرابع - الفصل الدراسي الأول - الساعات الأسبوعية ثلاث ساعات.

**Course Description:** This course is an introduction to the biology and ecology of corals and the reef structures they build. Topics includes: photobiology, biochemistry, physiology, reproduction, ecology, biogeography of corals. The coral reef community, such as algae, invertebrates, fish, will discussed. Course, will go through corals as resources for human utilization and impacts. Emphasis will be on Yemeni corals, but comparisons will be made among reefs from other areas. The practical component will include an introduction to the basic lab techniques of aquarium aspects; chemistry of the water, nitrogen cycle & biological filtration, aquarium design, engineering, theory and practice, and care and culture of marine and/ or freshwater fishes. Laboratory work includes water quality monitoring, care and maintenance of tropical systems and organisms, and an aquarium systems project.

**المقرر:** امراض وصحة الاسماك - المستوى الرابع - الفصل الدراسي الأول - الساعات الأسبوعية ثلاث ساعات.

**Course Description:** This course covers the basic concepts in fish diseases (as bacterial, virus, fungal, parasitic, nutritional and environmental diseases) and health.

It deals with mechanics of their pathology, symptoms, isolate their agents in laboratory, and methods of protection and treatment.

**المقرر:** تداول وحفظ الاسماك - المستوى الرابع - الفصل الدراسي الأول - الساعات الأسبوعية ثلاث ساعات.

**Course Description:** Located scheduled within courses which are divided into two parts: theoretical; and the student studies the foundations of fish handling and some marine biology, with the aim of delivery to the consumer's initial or final high quality, and learn ways to save appropriate, to enable the student to the basics of keeping fish products and like products properly without damage the product or the consumer. The practical part deals trading applications and keeping fish, and the changes that may arise after the harvest.

**المقرر:** مشروع بحث 1 - المستوى الرابع - الفصل الدراسي الأول - الساعات الأسبوعية ساعة واحدة.

**Course Description:** This course concerns an implementation of selected research project in one area of marine biology. This subject will be accomplished under supervision of one of the academic staff. The study plan of the project will include collection, analysis, discussion and evaluation of results for the proposed topic. Students well submit his research result in a form of scientific thesis which presented and discussed upon scientific committee in the department and evaluated to give the final degree. The final report of the project is constituted of two parts. Firstly, the theoretical background of the project which submitted in the first semester, whereas the other part concern of the practical division which submitted in the second semester of the year. This is an advanced undergraduate course and assumes prior knowledge in marine science, oceanography, basic scientific research and biostatistics and experimental design.

**المقرر:** التقنية الحيوية - المستوى الرابع - الفصل الدراسي الثاني - الساعات الأسبوعية ثلاث ساعات.

**Course Description:** Aims decision biotechnology to give a historical perspective on the emergence of this science, and is one of the courses that enable students to study what deity technical associated with interference beneficial between microbes and some marine biology, and fermentation industry for some fish products, in addition to knowledge of genetic engineering and its applications, and single-cell proteins. The practical part provides information and skills associated with the foundations of biotechnology.

**المقرر:** اللغة الانجليزية للبيولوجيين - المستوى الرابع - الفصل الدراسي الثاني - الساعات الأسبوعية

ساعتان.

**Course Description:** English Language for a Marine Biologist is a compulsory course designed to consolidate students' knowledge of Marine Biology English terms and

paragraph structure, organization, and function in the report (basic scientific writing) i.e., topic sentence, focusing on: description, comparison, cause and effect, etc. Students will be expected to give presentations with understanding and reflection, in addition to grammatical aspects and rhetorical functions that contribute to the paragraph type or the report type. At this level, students are encouraged to write with an audience in mind.

**المقرر: تكنولوجيا الاسماك - المستوى الرابع - الفصل الدراسي الثاني - الساعات الأسبوعية ثلاث ساعات.**

**Course Description:** This course is introduction to the fishing gear theory, design, repair, and analysis as it relates to fisheries, construction and assembly, fishing gear materials and accessories, the principle of operation. Classification of fishing gears and fishing gear materials. The efficiency and selectivity of fishing gears. The electronic aids to fishing. Emphasis is placed on various practical ropes; knots; marine hardware, particularly locally used. Course includes concepts of conservation including recent designs and devices that reduce bycatch and discards in fisheries. The course will include a wide range of learning experiences, including field work at sea, group and individual project work, laboratory exercises and computer-based activities. The course will feature a visit to working fishers' sites and at sea observing operations of an artisanal fishing boats and may conducting project on the environmental impacts of fishing. Course will include more hands-on experience working with fishing activities.

**المقرر: سلوك حيوان بحري - المستوى الرابع - الفصل الدراسي الثاني - الساعات الأسبوعية ساعتان.**

**Course Description:** This course introduces the marine animal behavior, emphasizing on an ecological and evolutionary understanding of behavior. Topics include approaches to physiological mechanisms, learning, behavioral ecology, visual, chemical and electrical communication, foraging, food & shelter, social organization, reproductive behavior, prey – predator relationships, and animal experiences. Students will be introduced to a combination of lectures, readings, discussion, and short researches with some selected marine animals focusing on fish population. Discussion will consider recent researches.

**المقرر: ديناميكية وإدارة الاسماك - المستوى الرابع - الفصل الدراسي الثاني - الساعات الأسبوعية ثلاث ساعات.**

**Course Description:** This course is designed to introduce quantitative fish population dynamics and fishery management, fishery problems, and aspects of fish biology relevant to exploitation. Students will participate in discussion and debate of fisheries issues.

**المقرر: مشروع بحث 2 - المستوى الرابع - الفصل الدراسي الثاني - الساعات الأسبوعية ساعتان.**

**Course Description:** This course concerns an implementation of selected research project in one area of marine biology. This subject will be accomplished under supervision of one of the academic staff. The study plan of the project will include collection, analysis, discussion and evaluation of results for the proposed topic. Students will submit his research result in a form of scientific thesis which presented and discussed upon scientific committee in the department and evaluated to give the final degree. The final report of the project is constituted of two parts. Firstly, the theoretical background of the project which submitted in the first semester, whereas the other part concern of the practical division which submitted in the second semester of the year. This is an advanced undergraduate course and assumes prior knowledge in marine science, oceanography, basic scientific research and biostatistics and experimental design.