



King Abdulaziz University  
Faculty of Marine Sciences

# Marine Programs Student Handbook

First Edition

2024

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## Journals:

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## Departments Location:

King Abdul-Aziz University (main campus).

Faculty of Marine Sciences.

Building. A70.

- Department of Marine Chemistry, 1<sup>st</sup> floor.
- Department of Marine Biology, 2<sup>nd</sup> floor.
- Department of Marine Geology, 3<sup>rd</sup> floor.
- Department of Marine Physics, 4<sup>th</sup> floor.

## **Purpose of the Handbook**

The Handbook is intended to outline the academic requirements for undergraduate students in the marine sciences faculty programs. In addition to overview and reflect the policies and procedures regarding them. However, the University established and administered many policies and procedures. For detailed information on policies regarding undergraduate students at KAU, the policies and procedures of KAU should be consulted. For further references, see [KAU Regulations and Policies](#).

## Table of Contents

<b>History</b> .....	6
1. Vision .....	6
2. Mission .....	6
3. Excellence Fields .....	6
<b>The academic system</b> .....	7
1. Admission and Registration .....	7
2. Course Registration .....	7
3. Evaluating Student Performance (student assessment and verification of standards) .....	8
4. Office hours .....	9
5. Teaching load .....	9
6. Attendance .....	9
7. Transfer Students .....	9
1) Transfer from Other Universities. ....	10
2) Transfer of Students within KAU. ....	10
3) Transfer of Students within the Faculty of Marine Science. ....	10
8. Leave of Absence .....	11
9. Graduation Requirements (132-credit hours) .....	11
10. Study Regulations and Tests .....	11
11. Guidance and Counseling Services .....	14
12. Rights and Duties .....	14
1) Rights and Duties of Department Students. ....	14
2) Student's Duties at Department. ....	15
3) Rights and Duties of Department Faculty members. ....	16
13. Complaints and Grievances .....	16

1) Grievances .....	16
2) Complaints .....	17
<b>Policies for Students .....</b>	<b>18</b>
1. Academic Integrity .....	18
1) Plagiarism. ....	18
2) Cheating. ....	18
2. Academic Misconduct .....	19
3. Academic Advising Guidelines.....	19
1) Guidelines for advisors .....	20
2) Guidelines for students .....	20
<b>The Curriculum (The Study Plan) .....</b>	<b>22</b>
1. Departments, Programs, Academic Degrees. ....	22
2. Graduation requirements. ....	22
First: University requirements (26 Units) .....	22
Second: Faculty requirements (40 Units) .....	23
Third: Scientific Departments (66 Units) .....	27
1) Marine Biology Department .....	27
2) Second: Marine Chemistry Department .....	39
3) Marine Geology Department .....	45
4) Marine Physics Department .....	53
<b>Program Structure and Organization .....</b>	<b>58</b>
B. Sc. Marine Biology Program .....	58
B. Sc. Marine Chemistry Program .....	61
B. Sc. Marine Geology Program .....	63
B. Sc. Marine Physics Program .....	65
<b>The specialization and job opportunities .....</b>	<b>67</b>

1. Specialization. ....	67
2. Skills, Scientific experiences, and acquired benefits in the specialization field. ....	67
1) Specialization field: Marine Biology .....	67
2) Specialization field: Marine Chemistry .....	68
3) Specialization field: Marine Geology .....	69
4) Specialization field: Marine Physics .....	69
<b>Faculty Members</b> .....	71
1. Marine Biology Department .....	71
2. Marine Chemistry Department .....	72
3. Marine Geology Department .....	73
4. Marine Physics Department .....	74

## **History:**

Marine sciences are considered among the modern sciences which importance has emerged due to the urgent need to exploit the vast marine resources after the human exhaustion of the terrestrial resources. It is well-known that our beloved Kingdom is blessed with stretching shorelines along the eastern part of the Red Sea and the western part of the Arabian Gulf, enabling it to exploit the living and non-living marine resources available in its territorial waters in various fields. The field of marine sciences became of an interest to the university for keeping up with global advancement in science and technology fields and for developing full understanding of the rules played by territorial waters in assuring water and food securities as well as in providing various energy resources. Accordingly, the university established a Marine Sciences Department within the Faculty of Sciences in 1975, then; in 1978; this department was developed to an independent Marine Sciences Institute and in 1981 a royal decree was issued for the transformation of the institute to the Faculty of Marine Sciences.

### **1. Vision:**

Distinguished academic and research faculty with sustainability and community partnership

### **2. Mission:**

To contribute effectively to the development of knowledge and research aspects of marine sciences as a social responsibility

### **3. Excellence Fields (Unique features):**

- The only faculty in the kingdom that awards B.Sc. degree in Marine Sciences.
- All the Faculty B.Sc. degree programs are internationally academically accredited formerly.
- The only applied sciences faculty in the university that offers M.Sc. degree to female students.
- The faculty has a multi-purposes research vessel fully-equipped with state-of-the-art technologies.

## The academic system

### 1. Admission and Registration

King Abdul-Aziz University (KAU) allows students to join the various faculties and obtain a bachelor's degree. Furthermore, admission into the university is according to the vacant seats, students' percentages in the high school, or the weighted percentage of students; King Abdul-Aziz University aspires to graduate qualified national cadres able to promote progressive development of the country.

For further information regarding the KAU admission requirements, please visit the following website [[admission.kau.edu.sa](http://admission.kau.edu.sa)].

A student can apply for admission to the Marine Sciences programs by visiting the educational affairs unit at the Marine Sciences Faculty.

### 2. Course Registration

All students must register for their courses online using Odus Plus system [[oduspluss.kau.edu.sa](http://oduspluss.kau.edu.sa)], and after having academic advising from the departments, the following explains some of the useful information that helps the students to complete the registration:

- 1) The student must have information on the dates, beginning, and ending of the course registration.
- 2) Using Odus Plus system, the scheduled dates of the respective course group are included in the academic calendar.
- 3) The student may have access to teaching material (By Blackboard) and students will be notified automatically by email whenever they are changed or canceled or posted in the course dashboard.
- 4) The student will be able to participate in the course evaluation survey. Additionally, email invitations for the course evaluation will be sent to all the students registered in the course.
- 5) The lecturer information can be posted in the Odus Plus to all registered students.
- 6) The minimum hours for course registration for undergraduate students is (12) credit hours per semester, and the maximum limit is (18) credit hours. It can be overridden to raise the maximum if the student is expected to graduate to (22) credit hours.
- 7) In any case, each student is responsible for their course registrations regardless of the academic advisor engages with the student or not.



### 3. Evaluating Student Performance (student assessment and verification of standards)

Assessment methods include examinations, written assignments, seminar presentations, individual research reports, poster presentations, in course tests. The timing and type of assessment is designed to provide, where feasible, a balance over each module, whilst also recognizing the needs, character and development of particular modules.

Staff guide students towards achieving assessment objectives through program delivery and via group and individual tutorials.

All Research project reports are marked. A sample of examination scripts and coursework are also marked. In the program, all borderline examination scripts plus a selection representing each honors class and failures plus project reports are internally (externally) moderated.

#### Summary of grades, marks, and their interpretation for honors degree classification

The overall marks required for the following degree classifications are:

Marks	Code	Description	Points
95-100	A+	Exception	5
90-94	A	Excellent	4.75
85-89	B+	Superior	4.5
80-84	B	Very Good	4
75-79	C+	Above Average	3.5
70-74	C	Good	3
65-69	D+	High Pass	2.5
60-64	D	Pass	2
0-59	F	Fail	1
	IP	In Progress	
	IC	In-Complete	
	DN	Denied	

## **4. Office hours**

All faculty members have assigned office hours where students can seek additional individual assistance; these are displayed on their office doors. In addition, students can contact faculty using contact details such as email and office phone numbers listed in the ODUS Plus system. The ODUS Plus system can also be used to schedule official meetings within office hours. Students may also contact faculty outside these hours as needed

## **5. Teaching load**

The teaching load for a faculty member is following the teaching loads of KAU, where the maximum limit of units for faculty members is as follows:

- Professor 10 teaching units.
- Associate Professor 12 teaching units.
- Assistant Professor 14 teaching units.
- Lecturer 16 teaching units.
- Teaching assistant 16 teaching units.

## **6. Attendance**

To encourage regular course attendance, KAU requires its students to attend at least 75% of their lectures and practical sessions. Students failing to meet this requirement in any of their courses are prohibited from attending the final examination and will acquire a DN. Furthermore, students who remain absent in the final examination of a course will not be given a substitute examination unless they provide a valid reason, approved by the Faculty Council.

## **7. Transfer Students**

KAU has laid down its policies and procedures for transfer students from other universities, within different KAU faculties, or different programs:

- 1) Transfer from Other Universities.
- 2) Transfer of Students within KAU.
- 3) Transfer of Students within the Faculty of Marine Science

### **1) Transfer from Other Universities.**

A student may transfer from other universities to the Marine sciences program at KAU if the following conditions are satisfied:

- The academic degree pursued by the student at the original university is sufficiently equivalent to the degree granted by KAU.
- The student should have a minimum GPA of 3.0 out of 5.0 or equivalent.
- The student should not have been dismissed for disciplinary reasons from the institution they are transferring from.
- The student must complete in the Marine sciences programs at least 50% of the credit units required by the KAU degree.
- Transfer students may transfer the courses taken in their previous institution if they are deemed equivalent to the corresponding courses in Marine sciences programs as determined by the program Curriculum Committee.
- Transfer courses are listed in the transcript but will not contribute to the student's cumulative GPA at KAU.

### **2) Transfer of Students within KAU.**

A student may transfer from only the Science-Track of KAU to the Faculty of Marine Science if the following conditions are met:

- A GPA not lower than 3.0 out of 5.0.
- The student has completed at least one full academic semester at the other Faculty.
- Grades earned for the courses taken by a transfer student in the previous College are accepted and considered in the students' degree.

### **3) Transfer of Students within the Faculty of Marine Science**

A student may transfer from one program to another within the Faculty of Marine Science if he has not completed more than 50% of the credit units required in the current program. The transfer is competitive and is based on the available seats in the sought program and the student's GPA. The

transfer is administered by the College Vice-Dean of Academic Affairs office, and priority is given to the top rank students based on their GPA. The student's previously taken courses remain in the student's record and are included in the GPA calculation.

## **8. Leave of Absence**

Leave of absence should a degree student find it necessary to interrupt active pursuit of the degree, they may petition the dean for a leave of absence for a specific period, generally limited to one calendar year. The following rules apply:

- Requests are submitted in advance of the year or semester concerned.
- Students are not allowed to discontinue the first two semesters of their enrollment in the university.
- The maximum number of leaves is three academic semesters.

## **9. Graduation Requirements (132-credit hours)**

Our program awards a Bachelor of Marine Science upon successful completion of 132-credit hours, with a minimum GPA of 3.00 out of 5.00. These 132-credit hours are further divided general university requirements, Faculty requirements, and program requirements as depicted in following:

- **First:** University requirements (26 Units).
- **Second:** Faculty requirements (40 Units).
- **Third:** Department requirements: Completion of the following (66) Units.

## **10. Study Regulations and Tests**

- 1) This is a trial version of the study regulations for the bachelor programs in Marine Science issued by the Marine Science Faculty at King Abdul-Aziz University:
- 2) These regulations apply to the plan of the bachelor's Marine Science programs in Marine Science Faculty at King Abdul-Aziz University based on the examination regulations and grading system for the bachelor's program at King Abdul-Aziz University.
- 3) The chairman secretariat, internal committees, and councils of the Marine Science Departments have administrative responsibility for operating the study regulation of the bachelor's program.
- 4) The student is graded in the study plan, which is equivalent to at least eight (8) academic semesters for

the university level.

- 5) The Department and Accreditation committee receives portfolios for all courses in the bachelor's program. The instructor/professor must create portfolio materials throughout the semester, and multi-instructor courses must submit a one-course portfolio.
- 6) The course portfolio is a collection of student work samples, usually compiled over time and rated using scoring rubrics, and it includes: Course syllabus or Course specifications, Teaching materials, Course assessment tools, Samples of student works, Student's final grade, Course assessment report or Course report, Student assessment of the course, and finally Faculty Vitae.
- 7) Instructors who teach the Marine Science courses may be Professors (Full, Associate, and Assistant), Lecturers, and Teaching assistants either with Ph.D. or M.Sc or B.Sc in Marine Science.
- 8) The examinations are done at the end of each teaching semester of each academic year. The grade of a course is an integer number.
- 9) The student must follow cell phones, food/drinks, and non-smoking regulations and rules in the Classroom:
  - The cell phone must be off or silent in any classroom/lab.
  - The instructors and students are not allowed to eat or drink in the classroom/lab.
  - Smoking is prohibited on the King Abdul-Aziz University campus.
- 10) The minimum academic load of the student is 12 credit hours, and the maximum is 18 credit hours. However, the academic advisor should approve the maximum load of the student and after checking the student's GPA.
- 11) Regular attendance is compulsory. Students are denied a course and banned from attending the final exam if they are absent for more than 25% of the total lectures and classes.
- 12) Withdrawal from a course or the University requires the faculty acceptance in which the student is registered. Each faculty and department of the University set deadline dates for each semester concerning withdrawal.

- 13) The Department Council or whomever it delegates may, in emergency cases, remove the deprivation and allow the student to enter the examination, provided they will give an acceptable excuse to the Department.
- 14) The grade calculated of the absent student from the final examination shall
- 15) be zero in the exam. However, their grade in that course shall be counted according to the scores of the coursework they obtain.
- 16) Suppose the student cannot attend the final examination in any semester course for an unavoidable reason. In that case, the College Council or whomever it delegates in very urgent cases could accept this excuse and permit them for a substitute examination to be conducted within a period not exceeding the end of the following semester. They shall be given the grade they obtain after sitting for the substitute exam.
- 17) Disrespect for anyone or anything in the lab will not be tolerated. It is your responsibility to make this classroom a safe space for everyone in it, including yourself.
- 18) In all discussions and group work, total respect for all people is required. All disagreements about work must stand and fall on reasoned arguments about principles, the data, or acceptable procedures, never based on power, loudness, or intimidation.
- 19) It is understandable and expected that students would share information and ideas with classmates. The lab session is meant to be collaborative work, and students will come with different methods and approaches to resolving the problems. This exchange of ideas is encouraged. Since this class students have profoundly diverse backgrounds, students are inspired to help each other and learn. Plagiarism will not be tolerated. If a student copies somebody else's work, showing data that is not belonging to the student, adding student names to a problem the student did not solve himself. All of these cases are considered academic misconduct. Whether intentional or unintentional, Plagiarism has severe consequences and might reach expulsion from the department and eventually from the University.

[For further references, see Academic Regulations and Policies of King Abdul-Aziz University.](#)

## **11. Guidance and Counseling Services**

Academic advising and counseling services is offered to prospective and declared Marine Science majors at the beginning of each academic year. Students are divided into small groups then assigned academic advisers offer them academic advising and counseling. This involves knowing about class schedules, academic standing, and semester grade point average, besides helping non-level students select their course of study and planning their schedules.

## **12. Rights and Duties**

Based on the university rights and regulations link, the department rights and regulations are summarized but not limited to:

- 1) Rights and Duties of Department Students.
- 2) Student's Duties at Department.
- 3) Rights and Duties of Department Faculty members.

### **1) Rights and Duties of Department Students.**

- The students' primary rights are to preserve their dignity and treat them respectably and fairly in the Marine Science departments.
- An appropriate study environment allows students to achieve the educational objectives and gain the knowledge that satisfy their ambitions and aspirations.
- An appropriate study environment enables students to achieve the educational objectives and obtain the knowledge that satisfy their ambitions and aspirations.
- The student has the right to determine the specialization accommodating their qualifications according to GPA and positions available at the Department.
- The student must follow an accredited study plan outlining the courses' hours, levels, and description and the requirements necessary for graduation.
- According to regulations, the student has the right to defer studying for a legitimate reason accepted by the college council according to regulations, and suspension should not exceed

two continuous semesters or three non-continuous semesters.

- The student should be notified of his failure in any course through the Department or the Odus Plus system.
- The student can add and withdraw from a course according to academic advising and counseling regulations.
- The student has the right to submit a request with justification to withdraw from a semester for a legitimately acceptable reason to the Department.
- The faculty members teach the student to adhere to the course syllabus or specifications when the study begins. This syllabus includes the course objectives, topics, and learning outcomes.
- The faculty member must attend the lectures and take tests as scheduled, go through the course theoretically and practically if possible, and announce their office hours and their office location.

## **2) Student's Duties at Department.**

- The student should respect the Department's rules, regulations, and decisions, including avoiding acting irregularly; otherwise, they will be exposed to the legal penalties that could have them dismissed entirely.
- The student should honorably represent their Department at the conferences, seminars, and internal or external participation.
- The student should respect all the Department's staff and its students and treat them respectfully.
- The student should respect the faculty members and asked for permission when they enter or leave the classroom or laboratory.
- The student should protect the Department's facilities, not damage them and not scribble on its walls, doors, and benches, and maintain the cleanliness of the classrooms and laboratories.
- The student should avoid cheating and copying or Plagiarism in homework, assignments,



quizzes, and exams, and they should adhere to the rules regulating exams and tests.

[For further information regarding Student's Rights and Duties at the KAU see University Student Regulations Rights and Responsibilities.](#)

### **3) Rights and Duties of Department Faculty members.**

- The Department's governance is focused intensely on agreement structure for developing academic programs and addressing issues and concerns the department face.
- To make a departmental decision/policy, the Department faculty members should suitably gather in departmental meetings. Decision-making/Polycymaking by the Department will be conducted within the framework of policy established by the University. Individual Department faculty members acknowledged these responsibilities following the University's policy on professional ethics and academic responsibility.
- The head of the department distributes teaching assignments (loads) to faculty members each semester periodically to ensure that all instructional faculty members are participating appropriately and equitably in the teaching missions of the Department, College, and University. Each Department faculty member is responsible for responding promptly on matters related to the teaching assignments by the head.
- All faculty member is responsible for keeping up with Department research interests and engaging appropriately in the research goals of the Department, College, and University.
- Departmental affairs shall be administered regularly, e.g., daily or weekly or biweekly, department meetings throughout the academic year, and via emails and electronic documents year-round distributed to all relevant Department faculty members. In addition, specific meetings shall be assembled when deemed necessary.

## **13. Complaints and Grievances**

### **1) Grievances**

Among student's rights is grievance allowing them to submit a complaint objecting to a decision issued

against them and requesting their right to be upheld or to clear their name, academically or otherwise. The rules require that Grievances be directed to the appropriate concerned party in the event of failing to obtain their rights outlined in the regulations.

## **2) Complaints**

Among student's responsibilities is obeying the rules for complaints. In addition, students are responsible for observing the chain of command in communicating complaints or requests starting with the course instructor, academic advisor, Department Head, College Administration, moving forward to concerned parties, and the University Administration.

[For further references see University Student Regulations Rights and Responsibilities](#)

## Policies for Students

In general, students follow all policies that are applied at King Abdul-Aziz University, and it is the primary reference for all policies followed in the department.

### 1. Academic Integrity

The academic work you do requires you to obtain selections that reflect integrity and responsible behavior. Infrequently, you may appear surprised by the amount of work you need to accomplish. For example, you may be short of time, working on several assignments due the same day, or preparing for exams or your project presentation.

Honesty is the framework of high-grade academic work. Whether you are working on a problem set, lab report, project or paper, avoid engaging in plagiarism or cheating. Follow this advice:

- 1) Plagiarism.
- 2) Cheating.

#### 1) Plagiarism

- First of all, you have to believe in the power of your ability.
- It is unacceptable to acquire essays/articles or have someone write an essay/article for you.
- Conduct research genuinely, sincerely, and recognize/acknowledge others for their work.
- It is unacceptable to copy ideas, data, or exact wording without citing your source with some rephrasing.

#### 2) Cheating

- Demonstrate your performance and accomplishments.
- It is unacceptable to copy answers from another student or ask another student to do your homework for you. Making up results is considered scientific misconduct.
- It is unacceptable to use a smartphone or other electronic devices during exams/tests or quizzes.
- Admit corrections and revisions from the instructor as part of the learning process.

- It is unacceptable to adjust graded exams and submit them for re-grading.
- Preferably, produce original, innovative and independent work for each class.
- It is unacceptable to submit projects or papers that have been done for a previous class.

## **2. Academic Misconduct**

Academic misconduct is fabrication, falsification, or plagiarism in study activities or deliberate interference. If a student is involved in the investigation of an allegation of Academic Misconduct (whether as a Complainant, as a Respondent, or as a person from whom information about allegations is obtained), investigators must ask guidance from the Vice Dean for academic affairs of the Faculty of Science and the policy requirements that may apply.

Overall, any type of allegations of Academic Misconduct by students will be addressed in accordance with [Student Guidebook](#).

## **3. Academic Advising Guidelines**

The advising process at KAU has a more general aim beyond our specific course choices and academic procedures/policies: to synthesize and contextualize students' educational experiences within the frameworks of their aspirations and abilities. As such, its goal is to support learning beyond campus boundaries and time frames. To this endeavor, KAU is keen to provide its students with effective academic and career advising, which starts from the beginning of them at the university. During the orientation week, the students are introduced to different university services of the Deanship of Students Affairs, Deanship of Admission and Registration, central library, medical center, extracurricular activities, and so forth. Students are informed about applying and admission to the different university faculties. KAU also has a central student advisory center, which organizes advising sessions regularly, leading people from different industry sectors and academia to present career guidelines. One other important aspect of this center is general counseling, which may involve personal counseling. Students are assigned to their advisors within the Marine Science programs, who provide them guidance pertaining to academic issues and careers. This includes, for example, advising about course choices, successfully acquiring degree requirements, academic policies/procedures, as well as broader concerns, such

as career and graduate school opportunities according to their major. Beyond this, all faculty members have assigned office hours where students can seek additional individual assistance; these are displayed on their office doors. In addition, students can contact faculty using contact details such as email and office phone numbers listed in the ODUS-Plus system. The ODUS-Plus system can also be used to schedule official meetings within office hours. Students may also contact faculty outside these hours as needed.

Academic Advising is offered to prospective and declared Marine Science majors. Students are divided into small groups then assigned academic advisers offer them academic advising and counseling. This involves knowing about class schedules, academic standing, and semester grade point average, besides helping non-level students select their course of study and planning their schedules.

These guidelines intend to formulate a reasonable minimum level of expectations between students and their advisors in the Marine Science Departments.

### **1) Guidelines for advisors**

- Schedule a 15-minute meeting for Registration Day.
- Know the course requirements for the Marine Science degree.
- Know if your students are progressing well or not.
- Do not agree to a schedule you do not think your student can complete. Do not be shy about refusing to sign off on an unrealistic schedule.
- Ask your student if there is anything going on that you should know about.
- If a student has trouble outside academics, work with them to find the right office to help them.
- Make sure you check up on your student two or three times during the term.
- Discuss with your students the best way to stay in contact.

### **2) Guidelines for students**

- Show up for your meeting on time.
- Know the requirements for your degree. If you have questions, ask your advisor.
- Do not ask your advisor to sign off on a schedule you cannot complete. Be aware that he or she

can refuse to do so. If that happens, understand their objection.

- Tell your advisor of anything going on in your life that could affect your academic performance. If you are not comfortable sharing the details, don't; but be sure to let your advisor know if you are having problems.
- If you are having problems, work with your advisor to find the right office to help you.
- Remember that advisors should not be expected to be available on a 24/7 basis, and cannot always help if you have left an issue until the last minute.
- [For more information, both advisors and students can visit the Academic Advising.](#)

## The Curriculum (The Study Plan)

### 1. Departments, Programs, Academic Degrees:

The faculty features four specialized departments, Marine Biology Department, Marine Chemistry Department, Marine Geology Department and Marine Physics Department; which award B.Sc. to students.

Department	Academic Degrees	Program Requirements	Program Years
Marine Biology Department	B.Sc. in Marine Biology	132 Units	4 years
Marine Chemistry Department	B.Sc. in Marine Chemistry	132 Units	4 years
Marine Geology Department	B.Sc. in Marine Geology	132 Units	4 years
Marine Physics Department	B.Sc. in Marine Physics	132 Units	4 years

### 2. Graduation requirements:

To obtain the B.Sc. degree in the faculty various programs, the student must complete the graduation requirements which are (132) units in four years of study based on the following classification: University requirements (10) units, faculty requirements (27) units, department requirements (60) units that consist of compulsory courses and elective courses for each program as well as the freely-selected courses from outside the department.

#### First: University requirements (26 Units)

Consist of two levels of Arabic language and two levels of Intensive English aimed at providing students with more language skills as well as four levels of Islamic culture aimed at implanting Islamic concepts and values in the student.

Course code and number	Course title	Units	Prerequisites
MS 101	Academic Skills in Marine Sciences	3	-
ELIS 101	Intensive English (1)	3	-
ARAB 101	Arabic Language	3	-
ELIS 102	Intensive English (2)	3	ELIG 101
ARAB 201	Arabic Language	3	ARAB 101
ISLS 101	Islamic Culture (1)	2	-
CPIT 110	Problem solving and programing	3	-
ISLS 201	Islamic Culture (2)	2	ISLS 101
ISLS 301	Islamic Culture (3)	2	ISLS 201
ISLS 401	Islamic Culture (4)	2	ISLS 301
<b>Total</b>	<b>26 Units</b>		

## Second: Faculty requirements (40 Units)

Consists of a set of courses that provide the student with the fundamentals of marine sciences and promotes the concept of integration between the disciplines of marine sciences and raise the level of skills in field work and its ability to deal with data and analysis.

Course code and number	Course title	Units	Prerequisites
MATH 110	Mathematics	3	-
MB 101	Essentials of Marine Biology	3	-
MC 101	Essentials of Marine Chemistry	3	-
MG 101	Essentials of Marine Geology	3	-
MP 101	Essentials of Marine Physics	3	-
MS 202	Marine Ecology	3	MB 101 + MG 101 + MP 101 + MC 101
MSC 201	An introduction to Marine Pollution	2	-
MSC 202	Dynamics of Marine Ecosystems	2	-
MSC 203	Statistical techniques for Oceanographers	3	MATH 110
MSC 204	Oceanographic Data Processing	3	-
MSC 205	An introduction to Remote Sensing in Marine Environment	2	-
MSC 206	An introduction to Integrated Coastal Zone Management	2	-
MSC 207	Marine Resources	3	-
MSC 307	Environmental impact assessment	3	MSC 206
MSC 308	Cooperative and Field Training	2	MSC 207 + MSC 307
<b>Total</b>	<b>40 Units</b>		

### Courses Description:

#### MB 101 Essentials of Marine Biology

Introduce students to the study of life in marine environments. Provide knowledge about the physical characteristics of the Earth's oceans. Provide prominent marine communities and their ecological uniqueness. Provide representative marine organisms from the five biological kingdoms. Provide environmental science principles related to ocean environments. Introduce to variety of lab experiences that include microscopic observation of organisms and their tissues, dissection of marine organisms, and introduce lab activities related to the ocean environment and organisms.



### **MC 101 Essentials of Marine Chemistry**

Introduces the basic knowledge's of marine chemistry including the importance of water structure, the distribution of nutrients and important gases like O<sub>2</sub>, CO<sub>2</sub> and green gases, major and minor elements as well as organic matter in the sea water.

### **MG 101 Essentials of Marine Geology**

An introductory course providing broad knowledge of marine geology, explaining marine geologic processes involved in ocean basin formation, the origin of ocean basins, ocean-floor morphology, the type and distribution of marine sediments and the most common marine mineral resources. In addition, the course will introduce the basics of coastal geological classifications, the role of sea level changes and their controls on sedimentation. The course will include introduction to different field techniques employed in marine geology.

### **MP 101 Essentials of Marine Physics**

Understanding of the various physical aspects of the ocean including ocean circulation (wave and currents), tides, physical properties of sea water, heat and other properties and the dynamic processes which control the movement of water as well as the roles of ocean circulation and other properties of ocean.

### **MS 201 Academic Skills in Marine Sciences**

The general knowledge and understanding of the morphology and nature of the sea floor, processes operative on, under and to the sea floor, floor spreading and plate tectonics and marine sediments and sedimentation. The physical and chemical properties of sea water and the geochemical processes which maintain ocean chemistry. The general circulation of the atmosphere and the major climatological regions of the world and nature of surface wind driven and deep ocean circulation The nature and origin of common disturbances of the sea surface, wind waves, tsunamis, tides. Biological diversity and biological processes in marine ecosystems, and how these biological processes interact with the physical and chemical environment

### **MS 202 Marine Ecology**

Basic ecological terms and ecosystem concepts, Principles of ecology, Marine Ecosystem and its Components, Characteristics of Marine Habitats, Coastal and Pelagic Environments, Benthic Environment, Ecology of Coral

Reef, Deep-Sea Ecology, Special Marine Environments, Human Impacts on Marine Ecosystems, Marine Conservation and Management.

### **MSC 201 An introduction to Marine Pollution**

Definition of Pollution, Sewage Pollution, Eutrophication and Organic Loading, Oil Pollution, Metals Pollution, Halogenated Hydrocarbons, Poly Organic Persistent (POPs) Compounds, Polychlorinated Biphenyl (PCBs) Compounds, Industrial Pollution, Radioactive Waste, Thermal Pollution

### **MSC 202 Dynamics of Marine Ecosystems**

Spatial and Temporal Scales, Biology and the Boundary Layers: Phytoplankton, Zooplankton and Benthic Plants, Biology of the Mixed Layer, Biology of the Coastal Waters, Biology of the Major Gyres, Rings and Eddies, Oceans and Global Climate Change, Physical and Biological Aspects

### **MSC 203 Statistical techniques for Oceanographers**

Introduce the students to different biostatistical methods and design, undergo and analyze experiments according to different designs. Formulate data analysis problems in a statistical framework; choose appropriate models for situations involving uncertainty and understand their key elements and properties. Apply statistical models and methods to solve practical problems; evaluate statistical evidence; interpret the results of a statistical analysis. comment critically on choices of model and analyses resulting from them

### **MSC 204 Oceanographic Data Processing**

Fundamentals of Oceanographic Data Collection, Input/output of Oceanographic Data, Graphical representation of oceanographic data, Correcting Data Errors and Missing Data, Statistical Data Analysis, Basics of Computer Programming and Applications.

### **MSC 205 An introduction to Remote Sensing in Marine Environment**

History of Remote Sensing, Basic definitions of Remote Sensing, Simple Introduction to physical principles of Remote Sensing, Remote Sensing Systems, Remote Sensing Platforms, Sensors and its technology, Satellite orbits, Oceanography Satellites.

### **MSC 206 An introduction to Integrated Coastal Zone Management**

Introduction to Coastal Area nomenclatures, Basic introduction to coastal planning and management principles, Basic introduction to Marine Ecosystems in the Arab region, Introduction to methods of collecting field data, Understanding Integrated Coastal Zone Management, Definitions and terms of Coastal Zone Management in Saudi Arabia.

### **MSC 207 Marine Resources**

Marine resources are materials that occur in the ocean and have value. They cover a wide range of living and non-living constituents ranging from biological diversity, fish and seafood supplies, oil and gas, minerals, sand and gravel, renewable energy resources, tourism potential, and unique ecosystems like coral reefs. This course is an introduction to the concept of marine living and non-living ocean resource. Students will gain a knowledge and understanding of several biological, geological, chemical and physical and other topics of contemporary relevance to ocean resources. These topics that are integrated to obtain a holistic approach to marine knowledge. The course further focuses on the opportunities and risks associated with their potential exploitation and the environmental and social implications.

### **MSC 307 Environmental impact assessment**

Evaluate the impact of human activities and development projects on the marine environment. The early identification of negative impacts of some projects reduces the risk of future adverse environmental effects, and proposes mitigation guidelines to avoid, reduce or remediate the negative effects. The course defines the methods and principles used for environmental assessment. It explains the dispersion patterns of pollutants and their ecological distribution. The course is designed to help students to acquire the basic skills for applying the project formulation, to be familiar with a wide range of laboratory and field methods directly applicable to the study of environmental problems and to conduct a successful EIA

### **MSC 308 Cooperative and Field Training**

Essentials of field work onboard Research Vessels, determination of the dimensions of the study area and the distribution of stations, selection of instruments with the appropriate specifications, selection of the best ways to transfer instruments to the study area, basic requirements for sampling and data collection and their relationship to the spatial and temporal dimensions of the measured phenomena in the field.

### Third: Scientific Departments (66 Units):

#### 1) Marine Biology Department

**History:** The Marine Biology Department was established in 1978 G (1398 H).

**Department requirements: Completion of the following (66) Units:**

- (26) Units of Compulsory Courses.
- (26) Units of elective Courses (based on pathway).
- (14) Units of Freely-Selected Courses (outside the department).

**Compulsory Courses within the department: (26) Units.**

**Compulsory Courses outside the department: (None).**

Course code and number	Course title	Units	Prerequisites
MB 210	Marine Biology	3	MB 101
MB 310	Marine Botany	3	MB 101
MB 311	Marine Invertebrates	3	MB 101
MB 312	Principles of Aquaculture	2	MB 101
MB 313	Principles of Swimming and Diving	2	-
MB 314	Ichthyology	3	MB 101
MB 315	Marine Microbiology	2	MB 101
MB 316	Coral Reefs	2	MB 311
MB 317	Physiology of Marine Organisms	3	MB 310 + MB 314
MB 318	Marine Plankton	3	MB 310 + MB 311
<b>Total</b>	<b>26 Units</b>		

**Pathways:**

#### A. Elective Courses for Marine Ecology Pathway (Bachelor of Marine Biology): (26) Units.

Course code and number	Course title	Units	Prerequisites
MB 470	Biostatistics and Experimental Design	3	MSC 203 + MATH 110
MB 475	Special Topics in Marine Biology	2	-
MB 490	Marine Benthos	2	MS 202 + MB 101 + MB 311
MB 491	Marine Mammals and Turtles	2	-
MB 492	Ecology of the Red Sea & Arabian Gulf	2	MB 316

Course code and number	Course title	Units	Prerequisites
MB 493	Pollution Effects on Marine Organisms	3	MB 311+ MB 314
MB 494	Marine Primary Producers	2	MB 470
MB 495	Marine Biodiversity	2	MB 311 + MB 314 + MB 316
MB 496	Deep Sea Biology	2	MS 202 + MB 210
MB 499	Marine Research Project	4	MB 475
MP 365	Integrated Coastal Zone Management	2	MSC 206 + MSC 307
<b>Total</b>	<b>26 Units</b>		

**B. Elective Courses for Aquaculture Pathway (Bachelor of Marine Biology): (26 Units).**

Course code and number	Course title	Units	Prerequisites
MB 470	Biostatistics and Experimental Design	3	MSC 203 + MATH 110
MB 472	Larval Development of Marine Organisms	3	MB 311 + MB 314
MB 475	Special Topics in Marine Biology	2	-
MB 480	Fish Culture	2	MB 311 + MB 312
MB 481	Fish Nutrition	2	MB 312 + MB 314
MB 482	Hatchery and Nursery	2	MB 312 + MB 314
MB 483	Fish Diseases	2	MB 314
MB 484	Water Quality Management	2	-
MB 485	Crustacean and Mollusk Culture	2	MB 311 + MB 312
MB 486	Small Aquarium Management	2	MB 312 + MB 314
MB 499	Marine Research Project	4	MB 475
<b>Total</b>	<b>26 Units</b>		

**C. Elective Courses for Fisheries Pathway (Bachelor of Marine Biology): (26 Units).**

Course code and number	Course title	Units	Prerequisites
MB 470	Biostatistics and Experimental Design	3	MSC 203 + MATH 110
MB 471	Introduction to Marine Fisheries	2	MB 101 + MB 314
MB 472	Larval Development of Marine Organisms	3	MB 311 + MB 314
MB 473	Fishing methods and Gears	2	MB 314
MB 474	Fisheries systematics	2	-
MB 475	Special Topics in Marine Biology	2	-
MB 476	Genetics Application in Fish	2	-
MB 477	Fish Population Dynamic	2	MB 314 + MB 471

Course code and number	Course title	Units	Prerequisites
MB 478	Fisheries economics and statistics	2	-
MB 479	Fisheries Management	2	-
MB 499	Marine Research Project	4	MB 475
<b>Total</b>	<b>26 Units</b>		

### Elective Courses:

#### Elective courses for Marine Biology Department: (9) Units

Course code and number	Course title	Units	Prerequisites
MB 483	Fish Diseases	2	MB 314
MB 488	Aquaculture Lab 1	2	MB 311+ MB 312 + MB 314
MB 489	Aquaculture Lab 2	2	MB 312 + MB 314 + MB 488
MB 410	Marine Plant Culture	2	MB 310 + MB 489
MB 411	Marine Ecology Lab	2	MB 311+ MB 314
MB 491	Marine Mammals and Turtles	2	MB 314
MB 413	Fish Processing	2	MB 312+ MB 314 + MB 462
MB486	Small Aquarium Management	2	MB 312 + MB 314
MB 415	Genetics Application in Fisheries	2	-
MB 416	Marine Biotechnology	2	MB 312 + MB 314
MB 417	Mangrove Ecosystem	2	MB 310 + MB 470
MB 418	Pollution Effects on Marine Organisms	3	MB 311 + MB 314
MB 419	Marine Animal Behaviors	2	MB 311 + MB 314
MB 497	Computer application in fisheries	2	-
MB 498	Fish Health management	2	-
MC 443	Marine Biochemistry	3	-
MS 201	Oceanography	3	-
MP 365	Integrated Coastal Zone Management	2	-
<b>Total</b>	<b>26 Units</b>		

### Courses Description

#### MB 210 Marine Biology

Introduction to general aspects of biological oceanography from phytoplankton to fish following the flow of energy from light, via primary producers and then through the food chain in a number of typical oceanic systems - from coastal to open-ocean. Introduce background reading ecosystems; coral reefs, seagrasses,

mangroves. Introduce sampling and data analysis of an estuarine marine systems for a short report describing the biological components of system.

### **MB 310 Marine Botany**

The morphology of algae, Asexual and sexual reproduction of algae life Cycle, Classification of algae groups and algae (Cyanophyceae, Chlorophyceae, Rhodophyceae, Phaeophycean, Charophyceae, Bacillariophyceae, Dinophyceae, Cryptophyceae, and Euglenophycin), environments of algae, Relation between algae, human being and environment. Principles and methods of algal culture and their economics, Importance of marine plant Economics. Introduction identification of halophytes, mangroves, and seagrasses. Morphological and anatomical adaptation, Environmental requirements, biogeography, zonation biomass and soil characteristics. Seasonality, litter fall and decomposition. Nutrient cycle and export. Environmental and pollution stresses.

### **MB 311 Marine Invertebrates**

A detailed taxonomic and biophysical study of models of important marine invertebrate phylums such as Protozoa groups (foraminifera, Heliozoan, Radiolaria, Mastigophore and Ciliophoran). Porifera, Coelenterate, Ctenophores. In addition to most worms phylum such as (Platyhelminthes, Nemertini, Annelida), moreover the study will include Mollusca, Arthropoda (Crustacea), and Echinodermata phyla, studying the most vital aspects of the main phylums and what distinguishes each phylum from the others, and also study the external and internal structures, its environments and their economic importance.

### **MB 312 Principles of Aquaculture**

Historical overview and definitions, culture methods for farmed areas and water quality, water systems (open, semi-closed and closed systems), water resources and quality, water and environmental variables and treatment, site selection, pond farming, cage farming and silos, natural and industrial nutrition and food sources, first examination and contaminant control.

### **MB 313 Principles of Swimming and Diving**

Basic equipment, ear and sinuses. Circulation and respiration, choking and drowning, Stress protective clothing, assistive equipment and survival devices, Nature of gases, Archimedes base, pneumatic cylinder bases, life

jackets and buoyancy equipment, lung expansion injury, emergency ascent, decompression sickness and its avoidance of nitrogen narcosis, CO<sub>2</sub> and CO poisoning, oxygen poisoning.

### **MB 314 Ichthyology**

An introduction to classification and geography of fishes, study of the adaptation and modification in external features and internal systems. Study some aspects such as ecology, food and feeding habits, reproduction and migration.

### **MB 315 Marine Microbiology**

General characteristics of microorganisms, importance and distribution of microorganisms in nature. Forms and structure of bacterial cell. Growth and nutrition of bacteria. Biological properties and their impact on marine microorganisms. Microorganisms environments and their classification. The role of bacteria and other microorganisms in the cycle of elements in the sea. Benefits and disadvantages of marine microorganisms.

### **MB 316 Coral Reefs**

Origin of coral reef and evolution during geological era. Corals and coral reefs, types of coral reefs, their distribution, their characteristics and modern structures in the world. (Morphology of corals), their physical characteristics (shape, size, anatomical characteristics, growth, reproduction, nutrition and its relation to symbiotic algae (zooxanthellae) with corals and their role in the coral ecosystem), distribution of modern mariners in the world. Environmental and non-living environmental factors contributing to the destruction of coral reefs, ways to conserve the coral reef environment.

### **MB 317 Physiology of Marine Organisms**

Respiratory dyes and energy sources, photosynthesis, nitrogenous regulation, fermentation, nitrogen fixation, external and toxic cellular products, movement and harmony, polarity and formation. Study of the general characteristics and structure of the marine animal, the different functions of marine animals (osmosis regulation, breathing and control of buoyancy, periodic system, nutrition, digestion and excretion. Body temperature and bioenergy, metabolism, movement, central nervous system, glandular system, growth and



reproduction), relationship of functions to the ecosystem surrounding the organism and control in the state of natural balance.

### **MB 318 Marine Plankton**

Introduction to plankton, plankton definition, foundations of classification, divisions of plankton according to the size of the factors affecting the growth of primary productivity of plankton, factors affecting buoyancy, sequencers and distribution quarterly, seasonal and vertical, their environment and life cycle, quantitative and qualitative recruitment of plankton in coastal environments, factors affecting vertical migration, interactions between terrestrial and other cultures, impact of pollutants on plankton, environmental, economic and health importance of plankton, plankton in the Red Sea and the Arabian Gulf, economic methods of plankton aquaculture.

### **MB 410 Marine Plant Culture**

Introduction to the types of cultured marine plants (seaweeds, algae and mangroves). Production and industrial importance of seaweed culture.

### **MB 411 Marine Ecology Lab**

Identification of different marine environments through field trips, methods of surveying different environments for collecting samples and information on different environments on the coast of the Red Sea, classification of samples from different aquatic groups in the laboratory, quantitative analysis of information using biodiversity equations with the help of specialized computer programs.

### **MB 413 Fish Processing**

Characteristics of fresh and spoiled fish, classification of spoiling, self-bacterial and biodegradation, handling of fish, conservation methods (cooling, salting, drying, smoking, canning), Manufacturing of aquaculture products.

### **MB 415 Genetics Application in Fisheries**

The description of fish genetic material, gene transmission and expression, phenotype and genetic abnormality, selection, breeding, genotype mapping and DNA/gene engineering manipulation and also includes principles

of the practical techniques for understanding of experiences on fish genetics related to the improvement of fish performances.

#### **MB 416 Maine Biotechnology**

Introduction to marine biotechnology. Bacteria and marine fungi in industrial and medical use. Microalgae and invertebrates as a source of chemical and pharmaceutical production, effect of biotechnology in fish farming and fisheries.

#### **MB 417 Mangrove Ecosystem**

Identification of mangroves and their classification, seaweeds, mutations in morphology and anatomy, environmental requirements and geographical distribution, zonation, biomass, characteristics of sea bottom, seasonal and subtraction, vegetative decay, nutrients cycle and estimation, environmental stresses and pollution, environmental and economic importance.

#### **MB 418 Pollution Effects on Marine Organisms**

understand about marine pollution, it's sources and its ill effects to the environment. They develop skills to measure the different pollutants present in the ocean.

#### **MB 419 Marine Animal Behavior**

Composition of the marine communities and the affecting factors, community's environments, food relations, zonation and distribution, regeneration, tunes, settlement sovereignty, social behavior and mating, random movement, learner behavior.

#### **MB 470 Biostatistics and Experimental Design**

Statistical terminology used in the design of experiments, experimental design, repetition, random distribution, experimental error, experimental error control, good experimental specification, statistical design types (simple experiments, multiple factor experiments), statistical analysis, Morality test. Presentation of statistical tables, comparison of averages of transactions and tables of average.

### **MB 471 Introduction to Marine Fisheries**

Classification of fisheries by fishing area, commercial value and type of marine environment. Fishing areas and main commercial fish species in the region, Environmental factors affecting fisheries (life and non-life) obstacles to fisheries development. Regional fisheries policies and management, Economic agreements, Marine fisheries law (Territorial waters, exclusive economic zone, continental shelf and island).

### **MB 472 Larval Development of Marine Organisms**

The Early life cycles and evolution of larval stages of marine invertebrates from sponges to echinoderms and fish according to external, internal developments and functional growth.

### **MB 473 Fishing Methods and Gears**

Fishing methods, selection of the appropriate fishing gears for the behavior of the fish and the type of bottoms, efficient and selectivity of fishing gears, communications, searching tools for sites and types of fish.

### **MB 474 Fisheries Systematics**

Fisheries systematics deals with the taxonomy and nomenclature of the commercial fish species and stocks. It also deals with the relationship between systematics and fisheries science and how systematics through the proper identification is important for fisheries management.

### **MB 475 Special Topics in Marine Biology**

Study of a biological phenomenon occurring in the seas and oceans which is often the focus of specialists in the field of marine life at the time. Learn the latest techniques used in the measurement of biological variables in the seas and oceans and to apply new methods for processing and analyzing marine biological data.

### **MB 476 Genetic Applications in Fish**

Introduction to fish genetics, cellular genes, cytogenetic and quantitative genetic methods in fish culture, methods of genetic communities in fisheries management.

### **MB 477 Fish Population Dynamic**

Traditional theories, analysis of fish communities, growth of fish communities and factors influencing on mortality, growth, breeding, crop models, estimation and application of fisheries data, estimation of survival rates and size of fish communities.

### **MB 478 Fisheries Economics and Statistics**

The application of statistics on the fishery science. The course is discussing and explaining the concepts of fishing industry and fishery economy and its sectors. It focuses on the data related to commercial fisheries, what are the required data, how to collect and how to analyse using different statistical tests.

The aim of this course is to help you organize your data (past or future) and to learn how to apply many of the statistical tests (that you have learned, should have learned, or will learn) to data collected from fishing industry sectors, along with learning some methods of sampling and analysis.

### **MB 479 Fisheries Management**

Principles of fisheries management and developments of fisheries, organizing fishery, fisheries statistics, sources and methods of collection- estimating the optimum production volume (equal - maximum), calculating the amount of trawl production, fisheries development and conservation, legislations and laws governing fisheries, causes of natural and industrial losses.

### **MB 480 Fish culture**

Introduce the students to the types of cultured fishes and their culture methods. Culturing methods for marine and freshwater fish, harvesting, transportation, and problems related to commercial scale culture of freshwater aquatic animals.

### **MB 481 Fish Nutrition**

Definitions, feed components, energy, proteins, fats, carbohydrates, vitamins and minerals, food requirements for aquatic animals. Preparation of processed feed, food ingredients for feeding fish, crustaceans and mollusks, preparation, transfer and storage of feed, feeding organisms and microalgae, rotifers and artemia.

### **MB 482 Hatchery and Nursery**

General principles, site selection, ponds designs, fertilization in the farm, stimulation of fertilization, laying eggs, nursery and transport, pollution and diseases, larvae culture, housing, provision of living and non-living food, water management, size sorting, harvesting and production of food for larvae.

### **MB 483 Fish diseases**

Biological and taxonomic studies on bacteria, viruses, fungi and pathogenic parasites. Diagnosis procedures, including pathological symptoms, internal relations hypothesis and histological diagnosis. Strategies used in control and control of diseases.

### **MB 484 Water Quality Management**

Identifies important chemical concepts as they apply to the aquatic environment, emphasizing their use in management of aquatic culture systems. Lectures will focus on physical and chemical properties of water, and cycles of major nutrients such as C, N, P, and S. Other topics covered will include management of water quality in various culture systems. Knowledge gained in formal lectures will be tested by interpretation of term field trials.

### **MB 485 Crustacean and Mollusc Culture**

**Culture** Introduction to types of cultured crustaceans (shrimps, crabs and lobsters) and mollusks (muscles - oyster - clams), methods of culture, site selection, selection of materials, mothers and reproduction. larval and developing stages, production economics.

### **MB 486 Small Aquariums Management**

Economic importance, installation of small fish aquariums for museums and houses, operation, maintenance and management.

### **MB 488 Aquaculture Lab 1**

Experiments on the culture of selected species of fish, crustaceans, seaweed and seaweed include growth rates, environmental requirements, housing and nutrition rates.

### **MB 489 Aquaculture Lab2**

Operating and run the hatchery, production of algal nutrients, collection, house and breeding of mothers, Incubation stages larval, collection of larvae, larval rearing and developing stages, control Predation, Preparation of work, tables feed the different phases of aquaculture, the preparation of specific combinations of food ingredients to feed fish and shellfish, methods of collecting shellfish samples, clinical examination of infected objects, isolate and diagnose pathogens, classification of pathogenic bacteria, re-infection in the laboratory, practical methods for control and treatment, visits to fish farms.

### **MB 491 Marine Mammals and Turtles**

Divisions of marine mammals and turtles, their presence, general characteristics and classification, (with emphasis on selected species found in the Red Sea and the Arabian Gulf) in terms of their diffusion, public life, special adaptations, conservation, protection and economic importance

### **MB 493 pollution Effects on Marine Organisms**

Definitions of pollution types and Sources pollution levels biological influences for pollution atmosphere and pollution effects water pollution and oxygen levels sewage effects super feeding of animals, petroleum pollution, various effects of pollution on marine organisms.

### **MB 494 Marine Primary Producers**

Introduction to phytoplankton, identification of plant phytoplankton. Classification bases, phytoplankton species, factors affecting phytoplankton growth, primary productivity, factors affecting buoyancy. Seasonal sequencing and distribution. Interactions between phytoplankton and other organisms. Impact of pollutants on phytoplankton, environmental importance economic and health of phytoplankton, phytoplankton in the Red Sea and the Arabian Gulf.

### **MB 495 Marine Biodiversity**

Introduction to the idea of improving the management of the environmental status of living aquatic resources through effective environmental practices such as biodiversity conservation and sound management of marine habitats. A description of the important characteristics of the major living groups and their adaptation to a

particular habitat(s). Diversity in aquatic environments at the local and global levels with a focus on marine environments and the physical, environmental and historical factors that influence this diversity. Methods that contribute to the creation and maintenance of patterns of diversity such as zonation, succession of generations and regression to different locations of marine organisms. Calculate the biodiversity factor in different ways. Biodiversity of marine organisms in the Red Sea.

### **MB 496 Deep Sea Biology**

Study the biology and ecology of deep sea organisms and their adaptations to life on the deep sea.

### **MB 497 Computer Application in Fisheries**

An introductory course which prepare students for both theoretical and practical courses in higher levels. Topics will include the history of using computers in Fisheries Research, Remote Sensing and Geographical Information Systems (GIS) in Fisheries Management and Research, Quantitative Research Surveys of Fish Stocks, Computers in fisheries population dynamics and Ecosystem Modelling. Image Recognition and Visualization in Fisheries Oceanography.

### **MB 498 Fish Health Management**

The concept of disease and its relation to marine organisms, common pathogens in the marine environment and aquaculture, complex relationships between pathogens and family, immune system in fish and immune response.

### **MB 499 Marine Research Project**

The student, under the supervision of a faculty member, will conduct a scientific research to study a marine biological phenomenon through necessary data and sample collection, analysis and interpretation in light of previous studies. The student will present his research and its results in a seminar where a committee of faculty members will examine and evaluate the student work through discussion.

## 2) Marine Chemistry Department

**History:** The Marine Chemistry Department was established in 1978 G (1398 H)

**Department requirements:** Completion of the following (66) Units:

- (37) Units of Compulsory Courses (within the department)
- (15) Units of Compulsory Courses (outside the department)
- (9) Units of Elective Courses (within the faculty)
- (5) Units of Freely-Selected Courses (outside the department)

**Compulsory Courses within the department: (37) Units**

Course code and number	Course title	Units	Prerequisites
MC 340	Marine Bioorganic Chemistry	1	CHEM 110
MC 341	Marine Chemistry	2	CHEM 110
MC 342	Marine Pollution	3	MSC 201
MC 343	Marine Organic Chemistry	3	CHEM 231 + MC 340
MC 440	Marine Instrumental and Analytical Chemistry	3	CHEM 211
MC 441	Marine Geochemistry	2	MC 343
MC 442	Cycle of Elements in Seawater	3	MC 101 + MC 341
MC 443	Marine Biochemistry	3	MC 343 + MC 340
MC 444	Chemistry of Marine Natural Products	3	CHEM 231 + MC 343
MC 445	Oceanography of Regional Seas	1	-
MC 446	Water quality	2	MSC 201
MC 447	Application of Electrochemistry in Marine Sciences	2	MC 341
MC 448	Chemistry of Coastal Water and Limnology	3	MC 442 + MC 441
MC 449	Stable isotopes Geochemistry	2	CHEM 202 + MC441
MC 499	Research Project	4	-
<b>Total</b>	<b>37 Units</b>		

**(15) Units of Compulsory Courses (outside the department)**

Course code and number	Course title	Units	Prerequisites
CHEM 210	General Chemistry	3	-
CHEM 202	General Chemistry 2	4	CHEM 210
CHEM 231	Organic Chemistry	4	CHEM 210
CHEM 211	Volumetric and Gravimetric Analysis	4	CHEM 210
<b>Total</b>	<b>15 Units</b>		



### Elective courses for Marine Chemistry Department: (9) Units

Course code and number	Course title	Units	Prerequisites
MS 201	Oceanography	3	-
MC450	Chemistry of Marine Biotechnology	2	MC 443
MC451	Applications of Nanotechnology in Marine Chemistry	2	MSC 201
MC452	Trace Metals in Sea water	3	MC 341
MB 312	Principles of Aquaculture	2	MB 101
MB 313	Principles of Swimming and Diving	2	-
MP 365	Integrated Coastal Zone Management	2	-
<b>Total</b>	<b>16 Units</b>		

### Courses Description

#### MC 340 Marine Bio-organic Chemistry

Provide the fundamental concepts related to the organic biochemistry. On completion of this course, the students should have subsequently built their knowledge in bio-organic chemistry topics including the identification and characterization of carbohydrates, lipids, amino acids, and nucleic acids.

#### MC 341 Marine Chemistry

The chemical and physical properties of pure water molecule, The effect of salinity on the chemical and physical properties of water molecule, Ionic interaction, Acid-base reactions, Complexation reactions, Redox reactions, Dissolved gases.

#### MC 342 Marine Pollution

Evaluation of the sources of marine pollutants (Organic Wastes, Oil spills, Metals, Halogenated hydrocarbons, Radioactivity waste, Solid wastes and heat); the magnitude of the problem created by their discharges; the effects caused by them; the fate of these materials in the marine environment and the mechanism for reducing or eliminating their adverse effects.

#### MC 343 Marine Organic Chemistry

Importance of marine organic matter, source of organic matter in marine environment, Primary production in Seawater, Classification of organic matter (dissolved & particulate) and its composition, Distribution and fate

of organic compounds, Interaction between organic matter & minerals, Organic sulphur compounds, Chemistry of aquatic humic substances.

#### **MC 440 Marine Instrumental and Analytical Chemistry**

The main instrumental analytical techniques used in different marine chemistry topics like spectrophotometry (absorption and emission) includes UV and IR instruments, total organic carbon, and separation techniques include thin layer, gas, and liquid chromatography.

#### **MC 441 Marine Geochemistry**

Study the origin and chemical history of the earth's oceans: Suspended matter, Interstitial water, Chemistry of the marine interfaces (air/water, water/sediments), Deposition and formation of (nodules, Calcium carbonate, Iron/manganese, Phosphorite and salts). General Study the origin of hydrothermal vents: Locations, Theories of formation of hydrothermal vents, Physical/chemical characteristics and interactions with the original sea water, mineralization, Comparison of four hydrothermal systems (Galapagos Spreading Center, 21 North, East Pacific Rise, Guaymas Basin, Gulf of California, and Red Sea hot brines). Detail study of the Red Sea hot brines: Discovery, Numbers and geographical positions, Physical, chemical and geochemical properties, Potential resources and their economic exploitation.

#### **MC 442 Cycle of Elements in Seawater**

Energy transfer through the food chain in the marine ecosystem. major constituents of seawater and the theories explaining the constancy of their concentrations are presented. cycling of the natural essential elements of nutritive value (nitrogen and phosphorus) as well as carbon. Cycling of sulfur is also presented due to its coupling with the cycling of other elements. The distribution of nutritive elements in the world Ocean and processes responsible.

#### **MC 443 Marine Biochemistry**

Photochemical reactions and effects of environment on it, Adaptation of metabolism (proteins, lipids and carbohydrates) in marine animals, Biochemical adaptation for diving, Anaerobic metabolism, Effect of hormones in marine animals, Adaptation of marine animals towards estuaries, Formation and structure of

calcified tissues in marine animals and calcium metabolism.

#### **MC 444 Chemistry of Marine Natural Products**

Bioactive compounds derived from marine flora and fauna. Among the topics covered are marine toxins and venoms, biosynthesis and functions of secondary metabolites, applications on the use of high-tech devices in the extraction of compounds.

#### **MC 445 Oceanography of Regional Seas**

Spatial and temporal variations of the chemical and physical characteristics (pressure, temperature, oxygen, salinity, and nutrient salts) at the regional sea water (Red Sea, Gulf of Aden, Arabian Gulf and Arabian Sea).

#### **MC 446 Water quality**

Water is arguably the most important physical resource as it is the one that is essential to human survival. Water quality was not very well documented and people knew relatively little about disease as it related to water quality. Water quality standards normally identify the concentration of component properties. Several water quality standards were established and implemented. National (Saudi Arabian Standards) (SAS) and selected international water quality standards for drinking water which are currently in use are presented in this course. In the Kingdom of Saudi Arabia, there are many areas where water supplies are limited. This course will present also the water resources and the challenges that face this sector in KSA.

#### **MC 447 Application of Electrochemistry in Marine Sciences**

The importance of electrochemistry in marine sciences, It focuses on electroanalytical techniques in particular stripping voltammetry and their role to understand trace metals speciation in seawater.

#### **MC448 Chemistry of Coastal Water and Limnology**

Describe the stresses impacting the coastal environment, the concepts of estuarine geochemistry, the processes taking place at the water/particle interface, and the factors influencing element's speciation in the coastal marine environment. It also includes the factors and stresses impacting the coastal environment, the concepts of estuarine geochemistry, and the factors influencing element's speciation in the coastal marine environment. It includes also the immunological aspects of freshwater lakes and rivers such as their distribution on the Earth

and hydrologic cycle, water molecule and its particular characteristics. Origin and distribution of lakes, lake morphology, zonation, trophic concepts and their classification according to their trophic level. It addresses also the chemistry of lakes and development of the redox conditions/reactions at their bottom sediments, and as well as nutrient cycling such as nitrogen and phosphorus.

#### **MC449 Stable Isotopes Geochemistry**

The theoretical and experimental principles of stable isotopes, definitions, fractionations in un- and equilibrium conditions of hydrologic and biological systems, standards and analytical techniques by the Isotopic Ratio Mass Spectrometry (IRMS). Isotope fractionation processes of selected elements such as: H, C, N, O, S, Li, B, Mg, Si, Ca, V, Fe, and their variations in nature of hydrosphere, biospheres, and sediments, and as well as in paleoclimatology and paleoceanography. It includes the nitrogen stable isotope fractionation in biological processes and their application in food-web, food adulteration, hydrology, agriculture, pollution and paleoclimate environment. It addresses also unstable (radiogenic  $^{14}\text{C}$ ) isotopes and stable carbon and oxygen isotope fractionation in carbonate and during photosynthesis, and how their ratios change in substances such as carbonates, organic matters and water (fresh or saline) according to changes in the environment and climate. It will also address also the use the marine Quaternary  $\delta^{18}\text{O}$  record and Milinkovic cycles, the  $\delta^{18}\text{O}$  records in the glacial ice, the  $\delta^{13}\text{C}$  records and their use in the estimation of ocean circulation and (paleo-) productivity. Moreover, isotopic fossils in the earliest life, radiogenic and short-lived ( $^{210}\text{Pb}$ ,  $^{134}\text{Cs}$  and  $^{137}\text{Cs}$ ) isotopes and their use in geochronology and determination of sediment accumulation rates.

#### **MC 450 Chemistry of Marine Biotechnology**

Provide the fundamental concepts related to the chemistry of the marine biotechnology (bacteria and fungi). It recognizes the importance of marine model systems that could provide new insight into basic biological principles that will benefit further development of medicine and industry.

#### **MC 451 Applications of Nanotechnology in Marine Chemistry**

Introduce the basic knowledge of nanotechnology. In addition to, study the chemical and physical properties of nanoparticles, the cross disciplinary nature of nanoscience and nanotechnology, and the applications of

nanotechnology in our life with a special emphasis on marine environment.

#### **MC 452 Trace Metals in Seawater**

Sources and sinks of trace metals in seawater, vertical and horizontal distribution in seawater- biogeochemical cycles of selected trace metals in seawater, speciation of trace metals.

#### **MC 499 Research Project**

The student selects his research title with the help of one of the staff members. He undertakes the necessary literature review and gives an oral presentation (seminar) in the presence of the Scientific Committee (SC) of the department by the end of the first ten weeks of the running semester (7<sup>th</sup>). If the presentation was accepted by the SC the student can undertake his research by the end of the semester (8<sup>th</sup>).

### 3) Marine Geology Department

**History:** The Marine Geology Department was established in 1978 G (1398 H)

**Department requirements:** Completion of the following (66) Units:

- (46) Units of Compulsory Courses (within the department)
- (7) Units of Compulsory Courses (outside the department)
- (8) Units of Elective Courses (within the faculty)
- (5) Units of Freely-Selected Courses (outside the department)

**Compulsory Courses within the department: (46) Units**

Course code and number	Course title	Units	Prerequisites
MG 220	Marine Sedimentology	3	MG 101 + MP 101
MG 320	Marine Carbonate Sediments	3	MG 220
MG 321	Marine Macrofossils	2	MS 202
MG 322	Mineralogy of Marine Sediments	3	MG 320 + EMR 111
MG 323	Marine Microfossils	2	MG 321 + MS 202
MG 324	Introduction to Marine Geophysics	3	MG 101 + MP 101 + MSC 204
MG 325	Geology of Red Sea & Arabian Gulf	2	-
MG 326	Coastal Zone Geology	3	-
MG 420	Quaternary Geology	3	MG 220 + MG 321 + MG 323
MG 421	Marine Sequence Stratigraphy	2	MG 220
MG 422	Remote Sensing in Marine Geology	3	MSC 205
MG 423	Geochemistry of Marine Sediments	3	MG 220 + MG 322
MG 424	Marine Mineral Resources	2	MG 322
MG 425	Paleoceanography	3	MG 322 + MG 423
MG 426	Applied Marine Geophysics	3	MG 324
MG 427	Geology of Deep-Sea	2	-
MG 499	Research Project	4	-
<b>Total</b>	<b>46 Units</b>		

**Compulsory courses from outside the department: (7) Units**

Course code and number	Course title	Units	Prerequisites
EMR 111	Mineralogy	3	-
EPS 202	Introduction to Petroleum Geology	2	EMR 111
MB 313	Principle of Diving and Swimming	2	-
<b>Total</b>	<b>7 Units</b>		

### Elective courses for Marine Geology Department: (8) Units

Course code and number	Course title	Units	Prerequisites
MS 201	Oceanography	3	-
MG 428	Special topics 1	2	-
MG 429	Special topics 2	2	-
MG 430	Marine Geology Seminar	1	-
MG 431	Specialized training	2	-
MG 432	Marine Geohazard	2	-
EPS 312	Drilling	2	EPS 202
EPS 340	Well logging	2	EPS 202
EPS 344	Subsurface Geology	2	EPS 202
EEG201	Introduction to Engineering and Environmental Geology	2	EMR 111
MC 446	Water quality	2	MSC 201
MP 365	Integrated Coastal Zone Management	2	-
MB 312	Principles of Aquaculture	2	MB 101
MP 465	Near-Shore Physical Processes	2	-
<b>Total</b>		<b>28 Units</b>	

### Courses Description

#### MG 220 Marine Sedimentology

Marine sedimentology concerns with the study of sediments and sedimentary rocks, focusing on how they are generated, transported, and deposited in marine environments. Most of the world's oil, natural gas, groundwater and many natural mineral resources occur in marine sediments and sedimentary rocks. The sediments and sedimentary rocks are good archives for sea level change, global climate, tectonics, and geochemical cycles as well as Earth's major events. The course helps students to understand the main types of marine sediments, their characteristics and classifications according to their origin and depositional setting. The course provides knowledge of the distribution of marine sediments in relation to climate and geological setting. It helps to understand the history of ocean exploration, methods of sediment sampling and marine processes.

### **MG 320 Marine Carbonate Sediments**

Calcium carbonate formation, Carbonate minerals, Difference between carbonate sediment and rocks, Carbonate rock content, Coral reefs, Deep water carbonate, Shallow water carbonate, Depositional environments of carbonate sediments.

### **MG 321 Marine Macrofossils**

Marine Macrofossils course lies under the domain of invertebrate paleontology with an emphasis on the major fossil groups (including living fossils) disseminated within the global geological time scale. This venue is part of the Faculty of Marine Sciences curriculum and will teach major fossil groups of marine organisms to the third-year students. Instructors and assistants expected to lay down the foundation of fossils found in the recent marine environments as well as these collected from exposed outcrops that may represent a good example to explain response to climate change and ecology in the geological history. Furthermore, extinction and flourishes of the major groups of ammonites and trilobites will be used intensively to explain biotopes and zonation. Other groups to be taught are gastropods, echinoids, bivalves, corals, and stromatolites. Students will be introduced to the field of fossil preservation (mineralization), taphonomy, biostratigraphy and correlations as an entry to hydrocarbons accumulation and exploration. Additionally, students will focus on concepts such as: paleogeography and paleoecology as they taught Wegner's interpretation of continental drift. Case studies for defining fossil zonation and relative age assessment of outcrop by using fossils backed by recent marine habitats.

### **MG 322 Mineralogy of Marine Sediments**

Heavy minerals, Factors affecting heavy mineral assemblages, Grain parameters and mechanism of hydrodynamic sorting, Physical and chemical mineral stabilities, Mineralogical maturity, Heavy minerals geochemistry, Light minerals, Clay minerals and their distribution in marine sediments, Bulk mineralogy for marine sediments.

### **MG 323 Marine Microfossils**

Types of calcareous and siliceous marine microfossils and their taxonomic classifications, The chemical



compositions of major groups of marine microfossils, Foraminifera ecology, distribution and taxonomy, The importance of Diatoms and Radiolaria in climate change and biostratigraphic studies, Coccolith distributions and their utilities in oil explorations and geological age determinations, Ostracoda ecology and distribution in nearshore environment and their response to marine pollution.

### **MG 324 Introduction to Marine Geophysics**

Introduction to Marine Geophysics, Physical properties of sediments/rocks, Marine seismic methods, Types of Echosounder devices, Electrical methods and data interpretation, Gravity methods and applications in marine geophysical studies, Magnetic methods and applications in marine geophysical studies.

### **MG 325 Geology of Red Sea & Arabian Gulf**

The basic knowledge underlying the geology of the Red Sea and Arabian Gulf, Saudi Arabia. The origin and formation of the Red Sea, morphology and topography of the Red Sea, geology and geophysics of Red Sea, hot brines and hydrothermal deposits of the Red Sea, Atlantis II Deep, origin and formation of the Arabian Gulf, morphology and topography of the Arabian Gulf, origin, composition and distribution of bottom sediments in the Arabian Gulf.

### **MG 326 Coastal Zone Geology**

Define the main depositional processes that work in coastal area and involved in sedimentation. Differentiate between the different marine environment according to the dominant depositional processes. Understand the interactions between coastal & marine processes and climatic effects on sedimentation

### **MG 420 Quaternary Geology**

The Quaternary geological period, beginning roughly two million years ago, is the most recent, and ongoing, period of Earth's history. It comprises a particularly dynamic timespan, characterized by major shifts in climate, expansion and contraction of continent-sized ice sheets, rises and falls in global sea level, migrations and extinctions of fauna and flora, and not least, the evolution and exponential rise in population of modern humans. These sequences of dramatic changes in the Earth's climate and biosphere have frequently imprinted themselves within natural proxy records – as physical, chemical and isotopic variations within sediments or

ice. Such proxy records, if they can be retrieved and deciphered, allow us to identify the timing, rate and mechanisms of past changes in climate and environment. This information is increasingly critical. It provides the context and perspective for both our present understanding and future prediction of climate, at a time when human modification of the climate system, via greenhouse gas emissions and pollutant aerosols, appears significantly under way.

### **MG 421 Marine Sequence Stratigraphy**

Sequence stratigraphy is a powerful predictive tool used for regional basin analysis. It helps to subdivide the sedimentary successions into units separated by surfaces generated in response to changes in sea level. It enhances the predictive aspect of the exploration of mineral resources. It is one of the most active research area in academic and industrial environments.

### **MG 422 Remote Sensing in Marine Geology**

Remote sensing and GIS course concern fundamental understanding of GIS and remote sensing concepts, and Interaction of electromagnetic radiation with atmosphere, Land, and water- Remote sensing Satellite (Landsat, Spot, Ikonos, Quickbird, Radar)- Satellite images Resolution- Comparison of Remote sensing Satellite to Study Coastal areas, and shallow water - Image processing (image enhancement, supervise classification and un-supervised classification images, change detection, water depth mapping and variation in bottom type) - Analysis and interpretation of data for marine geological studies ( carbonate environments, sabkhas, inter-tidal zone. Coastal change detection). knowledge of the diversity of data from existing and forthcoming airborne and spaceborne sensors and c) more specialised skills relating to new processing techniques that are becoming available.

### **MG 423 Geochemistry of Marine Sediments**

Basic principles of Geo-chemical processes. Igneous processes, Magma crystallization, Igneous rocks, Sea-water chemistry, Marine sediments geochemistry, Factors controlling the chemical composition of marine sediments, Anthropogenic influence on marine sediments.

### **MG 424 Marine Mineral Resources**

Classification of non-living marine resources, Economic minerals, Non-solid resources: oil and gas, evaporites, carbonates, phosphorites, metallic minerals, Red Sea hot brines, Atlantic II Deep.

### **MG 425 Paleoceanography**

Understanding the geologic history of the ocean with regard to circulation, chemistry, biology, geology and patterns of sedimentation. It includes an introduction about temperature, salinity, thermocline, surface/deep water circulation and productivity in the ocean. Vertical zones and provinces of upwelling, the dissolved organic matter (DOM) and the trophic structure. It will address the pelagic system and sedimentation, orbital forcing, effect of sunspots on climate, Milankovich cycles, El-Nino, little ice ages cycles, Dansgaard-Oeschger Cycles, Bond cycles and Heinrich events. General micropaleontology and its use in the biostratigraphy of marine sea records and chemical productivity including proxies such as Sr/Mg, Sr/Ca, Ca/Cd, Ba, oxygen and carbon isotopes and their uses in the determination of paleotemperature and paleosalinity of the ocean. It will also include the major events in ocean history including K/T boundary, Paleocene-Eocene warming, Eocene-Oligocene event, Middle Miocene event, Late Miocene event, Pliocene-Present ice world and Quaternary sea level change. It includes also marginal basins and their sensitivity to climatic change, Mediterranean anoxic events (sapropels) and Arabian Sea monsoonal variability.

### **MG 426 Applied Marine Geophysics**

A practical introduction to the application of marine geological and marine geophysical instrumentation and field methods for acquisition and analyses/interpretation of gravity, magnetic, and seismic profiles, Sonar technology, and bathymetric field data. There will be a theoretical introduction on the methods applied in the field and in the laboratories. The students must carry out an interpretation on the acquired/retrieved acoustic data set. In addition to describe, analyses the geophysical data and discuss the results in a report. The plan for course improvement is based on feedback from students, peer observation and external evaluation.

### **MG 427 Geology of Deep-Sea**

Description of ocean basins, Geological evolution of ocean basins, Continental drift, Sea floor spreading and plate tectonics, Morphological features of the ocean floor: Geology of the continental margins, Mid-ocean ridges, Abyssal plains, Hydrothermal vents, hydrothermal processes and deposits, Deep Sea mineral deposits, Metallic and non-Metallic deposits, Manganese nodules, Metallic muds, Sedimentation in the World Oceans: sediments types, genesis and distribution.

### **MG 428 Special Topics 1**

Allocated for teaching modern scientific topic(s) in marine geology and /or marine sciences.

### **MG 429 Special Topics 2**

Allocated for teaching advanced scientific developments and modern applications in the field of marine geology and/or marine sciences.

### **MG 430 Marine Geology Seminar**

Collect data and information about one selected topics:

- Site investigation for any marine environment (Ex. Red Sea, Mediterranean Sea, Arabian Gulf, Oceans, Lakes, ect.)
- Oceanography and marine Geology Foundations and concept
- Marine geology and environmental issues
- General practical application of marine geology use techniques.

At the end of this course, each student writes a report and revised this report with his supervisor then presents his findings and evaluated scientifically by MG-department staff members in a public lecture

### **MG 431 Specialized training**

Specialized training refers to training that focuses on specific skills or knowledge related to a particular Marine geology field. Specialized Training includes, without limitation, practical methods/techniques training; operation methods training; Geological and scientific training; and computer and systems training.

### **MG 432 Marine Geohazard**

Coastal areas are highly dynamic natural systems that interact with terrestrial, marine and atmospheric processes. Hazards such as Cyclone, high waves and surges or tsunamis, submarine Earthquakes, Volcanoes and landslide have led to major disasters and human livelihood in the coastal zones. These hazards expose a coastal area to risk of property damage, loss of life and environmental degradation. Hence, the study Marine Geo-hazards is important aspect of coastal zone management planning. This course will enable students to know the geo-environmental conditions that make natural earth processes hazardous to people.

### **MG 499 Research Project**

A research topic preferably related to marine geology, literatures review, field and laboratory works, record, analyze and synthesis the results graphically and statistically, preparation of a report; present the work in an open seminar.

#### 4) Marine Physics Department

**History:** The Marine Physics Department was established in 1978 G (1398 H)

**Department requirements:** Completion of the following (66) Units:

- (34) Units of Compulsory Courses (within the department)
- (13) Units of Compulsory Courses (outside the department)
- (14) Units of Elective Courses (within the faculty)
- (5) Units of Freely-Selected Courses (outside the department)

**Compulsory courses within the department: (34) Units**

Course code and number	Course title	Units	Prerequisites
MP 360	Marine Meteorology	3	MP 101
MP 361	Hydrography and water masses	3	MP 101
MP 362	Air-Sea Interaction	3	MATH 202 + MP 360
MP 363	Dynamical Oceanography (I)	3	MATH 202 + MP 360
MP 460	Ocean Circulation	3	MATH 202 + MP 361
MP 461	Waves and Tide	3	MATH 203 + PHYS 203
MP 462	Physical Oceanography of Adjacent Seas	2	MP 363
MP 463	Mean Sea Level: Measurements and Predication	2	-
MP 464	Modeling of Marine Dynamics	3	MATH 203 + MP 363
MP 465	Near-Shore Physical Processes	2	-
MP 366	Dynamical Oceanography (II)	3	MP 363
MP 499	Research Project	4	-
<b>Total</b>	<b>34 Units</b>		

**Compulsory courses from outside the department: (13) Units**

Course code and number	Course title	Units	Prerequisites
PHYS 110	General Physics	3	-
PHYS 203	General Physics (3)	4	MSC207 + MSC 307
MATH 202	Calculus (II)	3	MATH 110
MATH 203	Calculus (III)	3	MATH 110
<b>Total</b>	<b>13 Units</b>		

### Elective courses for Marine Geology Department: (14) Units

Course code and number	Course title	Units	Prerequisites
MS 201	Oceanography	3	-
MP 364	Special Topics in Physical Oceanography 1	2	-
MP 365	Integrated Coastal Zone Management	2	-
MP 467	Remote Sensing in Physical Oceanography	3	PHYS 203 + MP 460
MP 468	Special Topics in Physical Oceanography 2	2	-
MP 469	Marine Acoustics	3	PHYS 203 + MP 361
MC 446	Water quality	2	MSC 201
MG 326	Coastal Zone Geology	3	-
MSS220	Fundamental of Surveying	3	MATH 202
PHYS 252	Classical Mechanics	3	PHYS 110 + MATH 202
MATH 204	Differential Equations (1)	3	MATH 202
MATH 241	Linear Algebra	3	MATH 110
MATH 305	Differential Equations (2)	3	MATH 204 + MATH 205 + MATH 241
MATH 205	Series and Vector Analysis	3	MATH 202 + MATH 203
MB 312	Principles of Aquaculture	2	MB 101
MB 313	Principles of Swimming and Diving	2	-
<b>Total</b>	<b>42 Units</b>		

### Courses Description

#### MP 360 Marine Meteorology

The atmosphere, Meteorological elements (temperature, pressure, humidity, wind speed, radiations), Heat budget of the atmosphere, Hydrological cycle, Adiabatic processes, Atmospheric stability, Geostrophic and gradient winds, Dominant meteorological conditions over the oceans.

#### MP 361 Hydrography and water masses

Understanding of the various physical aspects of the ocean including ocean circulation (wave and currents), tides, physical properties of sea water, heat and other properties and the dynamic processes which control the movement of water as well as the roles of ocean circulation and other properties of ocean.

### **MP 362 Air-Sea Interaction**

General characteristics of the sea surface, Characteristics of atmospheric planetary boundary layer, Energy and momentum fluxes, Heat balance equation, Sensible heat flux, Stable and unstable conditions, Evaporation, Long- and short- wave radiant energy, Various empirical formulas for calculations of heat energy balance, Heat balance on global and local basis.

### **MP 363 Dynamical Oceanography (I)**

Fundamentals of geophysical fluid dynamics: Introduction, Coriolis force, governing equations, Rotation effects: Geostrophic flows and vorticity dynamics, Ekman layer, Linear barotropic waves, Barotropic instability, Large scale ocean circulation, Stratification effects: Stratification, Internal Waves, Turbulence in stratified Fluids.

### **MP 364 Special Topics in Physical Oceanography 1**

Introduce and discuss the most list of topical research issues in marine science. Fostering and developing scientific curiosity around the course theme.

### **MP 365 Integrated Coastal Zone Management**

Pressures on the coastal zone, Human alterations of coastal zone, Coastal impact assessment, The need and benefits for integrated coastal zone management (ICZM), Environmentally sensitive coastal zone planning, Sustaining the coast.

### **MP 460 Ocean Circulation**

General atmospheric circulation and its relation to oceanic surface circulation, Ekman layer, oceanic wind-driven circulation systems, vorticities and intensification of western (eastern) boundary currents in the oceans, Convergence and divergence of surface oceanic waters and the resulting upwelling and downwelling, Coastal upwelling.

### **MP 461 Waves and Tides**

Waves: Classification of waves, Wind generated waves, Wave forms in deep and shallow waters, Wave dispersion and group speed, Wave energy, Wave transformation effects: shoaling, refraction, diffraction and



reflection, Wave attenuation effects: breaking, friction and white capping, waves of unusual character, Tides: Tide-generating forces, The dynamical theory of tides, Tidal constituents, Tidal currents, Tidal Power.

#### **MP 462 Physical Oceanography of Adjacent Seas**

History of scientific exploration in the region, Climatology, Monsoonal wind and seawater circulation patterns, Seawater exchange between Red Sea and Gulf of Aden, Seawater exchange between Arabian Gulf and Gulf of Oman, surface and subsurface circulation of Arabian sea and its relation to the Indian Ocean Circulation, Distribution and variation of physical characteristics, Sea level changes.

#### **MP 463 Mean Sea Level: Measurements and Prediction**

Mean sea level (MSL), its analysis, and prediction at the local, regional, and global levels, use of tide measured data and satellite altimetry. It also focuses on MSL trends and their consequences and mitigations.

#### **MP 464 Modeling of Marine Dynamics**

Modeling principles, Coastal zone models, Oceanic circulation models, Wave models, Tidal models, Pollutant dispersion models, Red Sea and Arabian Gulf models.

#### **MP 465 Near-Shore Physical Processes**

Physical factors controlling sediment movements, Beach nomenclature, Sediment movements by currents and waves, Longshore currents and Rip currents, Sediment transport in tidal flats, Estuarine Circulation and its sediment transport effects.

#### **MP 466 Dynamical Oceanography (II)**

Layered models, stratified geostrophic dynamics, Upwelling, Quasi-Geostrophic dynamics, Baroclinic instability, Fronts, Jets and Vortices.

#### **MP 467 Remote Sensing in Physical Oceanography**

Concept of remote sensing, History of remote sensing, Physics of remote sensing, Satellite platform system, Image processing, Satellites for marine applications.

#### **MP 468 Special Topics in Physical Oceanography 2**

Introduce and discuss the most list of topical research issues in marine science. Fostering and developing scientific curiosity around the course theme.

**MP 469 Marine Acoustics**

Knowledge of parameters and conditions affecting the sound propagation and its application in the sea. Locating sound channels. Utilization of echo sounders.

**MP 499 Research Project**

The student, under the supervision of a faculty member, will conduct a scientific research to study a marine physical phenomenon through necessary data collection, data analysis and data interpretation in light of previous studies. The student will present his research and its results in a seminar where a committee of faculty members will examine and evaluate the student through discussion.

# B. Sc. Marine Biology Program

## Program Structure and Organization

### Year One

Semester 1					
Code	Course Title	Units			Prerequisites
		Lec.	Prac.	Credits	
Mandatory	Student must do the following courses				
MATH 110	Mathematics	3	-	3	-
MP 101	Essentials of Marine Physics	2	3	3	-
ELIS 101	Intensive English (1)	15	-	3	-
ARAB 101	Arabic Language	3	-	3	-
MG 101	Essentials of Marine Geology	2	3	3	-
<b>Total</b>				<b>15</b>	

Semester 2					
Code	Course Title	Units			Prerequisites
		Lec.	Prac.	Credits	
Mandatory	Student must do the following courses				
MS 101	Academic Skills in Marine Sciences	3	-	3	-
MC 101	Essentials of Marine Chemistry	2	3	3	-
MB 101	Essentials of Marine Biology	2	3	3	-
ELIS 102	Intensive English (2)	15	-	3	ELIG 101
ARAB 201	Arabic Language	3	-	3	ARAB 101
<b>Total</b>				<b>15</b>	

### Year Two

Semester 3					
Code	Course Title	Units			Prerequisites
		Lec.	Prac.	Credits	
Mandatory	Student must do the following courses				
ISLS 101	Islamic Culture (1)	2	-	2	-
MSC 201	An Introduction to Marine Pollution	2	-	2	-
MSC 202	Dynamics of Marine Ecosystems	2	-	2	-
MS 202	Marine Ecology	3	-	3	MB 101 + MG 101 + MP 101 + MC 101
CPIT 110	Problem solving and programming	3	-	3	-
MB 210	Marine Biology	2	3	3	MB 101
	Free Course	-	-	2	-
<b>Total</b>				<b>17</b>	

Semester 4					
Code	Course Title	Units			Prerequisites
		Lec.	Prac.	Credits	
Mandatory	Student must do the following courses				
ISLS 201	Islamic Culture (2)	2	-	2	ISLS 101
MSC 203	Statistical techniques for Oceanographers	2	3	3	MATH 110
MSC 204	Oceanographic Data Processing	2	3	3	-
MSC 205	An Introduction to Remote Sensing in Marine Environment	2	-	2	-
MSC 206	An Introduction to Integrated Coastal Zone Management	2	-	2	-
MSC 207	Marine Resources	2	3	3	
	Free Course	-	-	2	-
<b>Total</b>				<b>17</b>	

### Year Three

Semester 5					
Code	Course Title	Units			Prerequisites
		Lec.	Prac.	Credits	
Mandatory	Student must do the following courses				
ISLS 301	Islamic Culture (3)	2	-	2	ISLS 201
MSC 307	Environmental impact assessment	2	3	3	MSC 206
MB 310	Marine botany	2	3	3	MB 101
MB 311	Marine Invertebrates	2	3	3	MB 101
MB 312	Principles of Aquaculture	2	-	2	MB 101
MB 313	Principles of swimming and diving	1	3	2	-
<b>Total</b>				<b>15</b>	

Semester 6					
Code	Course Title	Units			Prerequisites
		Lec.	Prac.	Credits	
Mandatory	Student must do the following courses				
ISLS 401	Islamic Culture (4)	2	-	2	ISLS 301
MSC 308	Cooperative and Field Training	1	3	2	MSC 207 + MSC 307
MB 314	Ichthyology	2	3	3	MB 101
MB 315	Marine Microbiology	1	3	2	MB 101
MB 316	Coral Reef	1	3	2	MB 311
MB 317	Physiology of Marine Organisms	2	3	3	MB 310 + MB 314
MB 318	Marine Plankton	2	3	3	MB 101 + MB 311
	Free Course	-	-	1	-
<b>Total</b>				<b>18</b>	

## Year Four (3 Routes)

### • Marine Fisheries Route

Semester 7					
Code	Course Title	Units			Prerequisites
Mandatory	Student must do the following courses	Lec.	Prac.	Credits	
MB 470	Biostatistics and Experimental Design	2	3	3	MSC 203 + MATH 110
MB 471	Introduction to Marine Fisheries	2	-	2	MB 101 + MB 314
MB 472	Larval Development of Marine Organisms	2	3	3	MB 311 + MB 314
MB 473	Fishing Methods and Gears	2	-	2	MB 314
MB 474	Fisheries systematics	1	3	2	
MB 475	Special topics in Marine Biology	2	-	2	-
Elective	Student may select from the elective courses	-	-	4	-
<b>Total</b>				<b>18</b>	

Semester 8					
Code	Course Title	Units			Prerequisites
Mandatory	Student must do the following courses	Lec.	Prac.	Credits	
MB 499	Marine Research Project	4	-	4	MB 475
MB 476	Genetics Application in Fisheries	2	-	2	-
MB 477	Fish population Dynamics	2	-	2	MB 314 + MB 471
MB 478	Fisheries economics and statistics	2	-	2	-
MB 479	Fisheries Management	2	-	2	-
Elective	Students may select from the elective courses	-	-	5	-
<b>Total</b>				<b>17</b>	

### • Aquaculture Route

Semester 7					
Code	Course Title	Units			Prerequisites
Mandatory	Student must do the following courses	Lec.	Prac.	Credits	
MB 470	Biostatistics and Experimental Design	2	3	3	MSC 203
MB 475	Special topics in Marine Biology	2	-	2	-
MB 472	Larval Development of Marine Organisms	2	3	3	MB 311 + MB 314
MB 480	Fish Culture	2	-	2	MB 311 + MB 312
MB 481	Fish Nutrition	2	-	2	MB 312 + MB 314
MB 482	Hatchery and Nursery	2	-	2	MB 312 + MB 314
Elective	Student may select from the elective courses	-	-	4	-
<b>Total</b>				<b>18</b>	

Semester 8					
Code	Course Title	Units			Prerequisites
Mandatory	Student must do the following courses	Lec.	Prac.	Credits	
MB 499	Marine Research Project	4	-	4	MB 475
MB 483	Fish Diseases	2	-	2	MB 314
MB 484	Water Quality Management	2	-	2	-
MB 485	Crustacean and Mollusc Culture	2	-	2	MB 311 + MB 312
MB 486	Small Aquarium Management	1	3	2	MB 312 + MB 314
Elective	Student may select from the elective courses	-	-	5	-
<b>Total</b>				<b>17</b>	

### • Marine Ecology Route

Semester 7					
Code	Course Title	Units			Prerequisites
Mandatory	Student must do the following courses	Lec.	Prac.	Credits	
MB 470	Biostatistics and Experimental Design	2	3	3	MSC 203 + MATH 110
MB 490	Marine Benthos	1	3	2	MS 202 + MB 101 + MB 311
MB 491	Marine Mammals and Turtles	2	-	2	-
MB 492	Ecology of the Red Sea & Arabian Gulf	2	-	2	MB 316
MB 475	Special topics in Marine Biology	2	-	2	-
MB 493	Pollution Effects on Marine Organisms	2	3	3	MB 311 + MB 314
Elective	Student may select from the elective courses	-	-	4	-
<b>Total</b>				<b>18</b>	

Semester 8					
Code	Course Title	Units			Prerequisites
Mandatory	Student must do the following courses	Lec.	Prac.	Credits	
MB 499	Marine Research Project	4	-	4	MB 475
MP 365	Integrated Coastal Zone Management	2	-	2	MSC 206 + MSC 307
MB 494	Marine Primary Producers	2	-	2	MB 470
MB 495	Marine Biodiversity	2	-	2	MB 311 + MB 314 + MB 316
MB 496	Deep sea biology	2	-	2	MS 202 + MB 210
Elective	Students may select from the elective courses	-	-	5	-
<b>Total</b>				<b>17</b>	



## Elective Courses

Code	Course Title	Units			Prerequisites
		Lec.	Prac.	Credits	
<b>Elective</b>	<b>Student may select 9 credits from 39 credits</b>				
MB 483	Fish Diseases	2	-	2	MB 314
MB 488	Aquaculture Lab 1	1	3	2	MB 311+ MB 312 + MB 314
MB 489	Aquaculture Lab 2	1	3	2	MB 312 + MB 314 + MB 488
MB 410	Marine Plant Culture	2	-	2	MB 310 + MB 489
MB 411	Marine Ecology Lab	1	3	2	MB 311+ MB 314
MB 491	Marine Mammals and Turtles	2	-	2	MB 314
MB 413	Fish Processing	2	-	2	MB 312+ MB 314 + MB 462
MB 486	Small Aquarium Management	1	3	2	MB 312 + MB 314
MB 415	Genetics Application in Fisheries	2	-	2	-
MB 416	Marine Biotechnology	2	-	2	MB 312 + MB 314
MB 417	Mangrove Ecosystem	2	-	2	MB 310 + MB 470
MB 418	Pollution Effects on Marine Organisms	2	3	3	MB 311 + MB 314
MB 419	Marine Animal Behaviors	2	-	2	MB 311 + MB 314
MB 497	Computer application in fisheries	1	3	2	-
MB 498	Fish Health management	2	-	2	-
MC 443	Marine Biochemistry	2	3	3	-
MS 201	Oceanography	3	-	3	-
MP 365	Integrated Coastal Zone Management	2	-	2	-
<b>Total</b>				<b>39</b>	

## B. Sc. Marine Chemistry Program

### Program Structure and Organization

#### Year One

Semester 1					
Code	Course Title	Units			Prerequisites
Mandatory	Student must do the following courses	Lec.	Prac.	Credits	
MATH 110	Mathematics	3	-	3	-
MP 101	Essentials of Marine Physics	2	3	3	-
ELIS 101	Intensive English (1)	15	-	3	-
ARAB 101	Arabic Language	3	-	3	-
MG 101	Essentials of Marine Geology	2	3	3	-
<b>Total</b>				<b>15</b>	

Semester 2					
Code	Course Title	Units			Prerequisites
Mandatory	Student must do the following courses	Lec.	Prac.	Credits	
MS 101	Academic Skills in Marine Sciences	3	-	3	-
MC 101	Essentials of Marine Chemistry	2	3	3	-
MB 101	Essentials of Marine Biology	2	3	3	-
ELIS 102	Intensive English (2)	15	-	3	ELIG 101
ARAB 201	Arabic Language	3	-	3	ARAB 101
<b>Total</b>				<b>15</b>	

#### Year Two

Semester 3					
Code	Course Title	Units			Prerequisites
Mandatory	Student must do the following courses	Lec.	Prac.	Credits	
ISLS 101	Islamic Culture (1)	2	-	2	-
MSC 201	An Introduction to Marine Pollution	2	-	2	-
MSC 202	Dynamics of Marine Ecosystems	2	-	2	-
MS 202	Marine Ecology	3	-	3	MB 101 + MG 101 + MP 101 + MC 101
CPIT110	Problem solving and programming	3	-	3	-
CHEM110	General Chemistry	3	-	3	-
	Free Course	-	-	2	-
<b>Total</b>				<b>17</b>	

Semester 4					
Code	Course Title	Units			Prerequisites
Mandatory	Student must do the following courses	Lec.	Prac.	Credits	
ISLS 201	Islamic Culture (2)	2	-	2	ISLS 101
MSC 203	Statistical techniques for Oceanographers	2	3	3	MATH 110
MSC 204	Oceanographic Data Processing	2	3	3	-
MSC 205	An Introduction to Remote Sensing in Marine Environment	2	-	2	-
MSC 206	An Introduction to Integrated Coastal Zone Management	2	-	2	-
MSC 207	Marine Resources	2	3	3	-
	Free Course	-	-	2	-
<b>Total</b>				<b>17</b>	

#### Year Three

Semester 5					
Code	Course Title	Units			Prerequisites
Mandatory	Student must do the following courses	Lec.	Prac.	Credits	
ISLS 301	Islamic Culture (3)	2	-	2	ISLS 201
MSC 307	Environmental impact assessment	2	3	3	MSC 206
CHEM 202	General Chemistry 2	3	3	4	CHEM 110
CHEM 231	Organic Chemistry	3	3	4	CHEM 110
MC 340	Marine Bio-organic Chemistry	1	-	1	CHEM 110
MC 341	Marine Chemistry	2	-	2	CHEM 110
	Free Course	-	-	1	-
<b>Total</b>				<b>17</b>	

Semester 6					
Code	Course Title	Units			Prerequisites
Mandatory	Student must do the following courses	Lec.	Prac.	Credits	
ISLS 401	Islamic Culture (4)	2	-	2	ISLS 301
MSC 308	Cooperative and Field Training	1	3	2	MSC 207 + MSC 307
CHEM 211	Volumetric and Gravimetric Analysis	3	3	4	CHEM 110
MC 342	Marine pollution	2	3	3	MSC 201
MC 343	Marine Organic Chemistry	2	3	3	CHEM 231+ MC 340
Elective	Student may select from the elective courses	-	-	3	-
<b>Total</b>				<b>17</b>	

## Year Four

Semester 7						Semester 8					
Code	Course Title	Units			Prerequisites	Code	Course Title	Units			Prerequisites
Mandatory	Student must do the following courses	Lec.	Prac.	Credits		Mandatory	Student must do the following courses	Lec.	Prac.	Credits	
MC 440	Marine Instrumental and Analytical Chemistry	2	3	3	CHEM 211	MC 446	Water quality	1	3	2	MSC 201
MC 441	Marine Geochemistry	2	-	2	MC 343	MC 447	Application of Electrochemistry in Marine Sciences	1	3	2	MC 341
MC 442	Cycle of Elements in Sea Water	2	3	3	MC 101+ MC 341	MC 448	Chemistry of Coastal Water and limnology	2	3	3	MC 442 + MC 441
MC 443	Marine Biochemistry	2	3	3	MC 343 + MC 340	MC 449	Stable isotopes Geochemistry	2	-	2	CHEM 202 + MC 441
MC 444	Chemistry of Marine Natural Products	2	3	3	CHEM 231+ MC 343	MC 499	Research Project	4	-	4	-
MC 445	Oceanography of Regional Seas	1	-	1	-						
Elective	Student may select from the elective courses	-	-	3	-	Elective	Student may select from the elective courses	-	-	3	-
<b>Total</b>				<b>18</b>		<b>Total</b>				<b>16</b>	

## Elective Courses

Code	Course Title	Units			Prerequisites
Elective	Student may select 9 credits from 16 credits	Lec.	Prac.	Credits	
MS 201	Oceanography	3	-	3	-
MC 450	Chemistry of Marine Biotechnology	2	-	2	MC 443
MC 451	Applications of Nanotechnology in Marine Chemistry	2	-	2	MSC 201
MC 452	Trace Metals in Sea water	2	3	3	MC 341
MB 313	Principles of Swimming and Diving	1	3	2	-
MP 365	Integrated Coastal Zone Management	2	-	2	-
MB 312	Principles of Aquaculture	2	-	2	MB 101
<b>Total</b>				<b>16</b>	



## B. Sc. Marine Geology Program

### Program Structure and Organization

#### Year One

Semester 1					
Code	Course Title	Units			Prerequisites
Mandatory	Student must do the following courses	Lec.	Prac.	Credits	
MATH 110	Mathematics	3	-	3	-
MP 101	Essentials of Marine Physics	2	3	3	-
ELIS 101	Intensive English (1)	15	-	3	-
ARAB 101	Arabic Language	3	-	3	-
MG 101	Essentials of Marine Geology	2	3	3	-
<b>Total</b>				<b>15</b>	

Semester 2					
Code	Course Title	Units			Prerequisites
Mandatory	Student must do the following courses	Lec.	Prac.	Credits	
MS 101	Academic Skills in Marine Sciences	3	-	3	-
MC 101	Essentials of Marine Chemistry	2	3	3	-
MB 101	Essentials of Marine Biology	2	3	3	-
ELIS 102	Intensive English (2)	15	-	3	ELIG 101
ARAB 201	Arabic Language	3	-	3	ARAB 101
<b>Total</b>				<b>15</b>	

#### Year Two

Semester 3					
Code	Course Title	Units			Prerequisites
Mandatory	Student must do the following courses	Lec.	Prac.	Credits	
ISLS 101	Islamic Culture (1)	2	-	2	-
MSC 201	An Introduction to Marine Pollution	2	-	2	-
MSC 202	Dynamics of Marine Ecosystems	2	-	2	-
MS 202	Marine Ecology	3	-	3	MB 101 + MG 101 + MP 101 + MC 101
CPIT 110	Problem solving and programing	3	-	3	-
MG 220	Marine Sedimentology	2	3	3	MG 101 + MP 101
	Free Course	-	-	2	-
<b>Total</b>				<b>17</b>	

Semester 4					
Code	Course Title	Units			Prerequisites
Mandatory	Student must do the following courses	Lec.	Prac.	Credits	
ISLS 201	Islamic Culture (2)	2	-	2	ISLS 101
MSC 203	Statistical techniques for Oceanographers	2	3	3	MATH 110
MSC 204	Oceanographic Data Processing	2	3	3	-
MSC 205	An Introduction to Remote Sensing in Marine Environment	2	-	2	-
MSC 206	An Introduction to Integrated Coastal Zone Management	2	-	2	-
MSC 207	Marine Resources	2	3	3	-
	Free Course	-	-	2	-
<b>Total</b>				<b>17</b>	

#### Year Three

Semester 5					
Code	Course Title	Units			Prerequisites
Mandatory	Student must do the following courses	Lec.	Prac.	Credits	
ISLS 301	Islamic Culture (3)	2	-	2	ISLS 201
MSC 307	Environmental impact assessment	2	3	3	MSC 206
EMR 111	Mineralogy	2	3	3	-
MG 320	Marine Carbonate Sediments	2	3	3	MG 220
MG 321	Marine Macrofossils	1	3	2	MS 202
MB 313	Principle of Diving and Swimming	2	-	2	-
<b>Total</b>				<b>15</b>	

Semester 6					
Code	Course Title	Units			Prerequisites
Mandatory	Student must do the following courses	Lec.	Prac.	Credits	
ISLS 401	Islamic Culture (4)	2	-	2	ISLS 301
MSC 308	Cooperative and Field Training	1	3	2	MSC 207 + MSC 307
MG 322	Mineralogy of Marine Sediments	2	3	3	MG 320 + EMR 111
MG 323	Marine Microfossils	1	3	2	MG 321+ MS 202
MG 324	Introduction to Marine Geophysics	2	3	3	MG 101+ MP 101+ MSC 204
MG 325	Geology of Red Sea & Arabian Gulf	2	-	2	-
MG 326	Coastal Zone Geology	2	3	3	-
	Free course			1	-
<b>Total</b>				<b>18</b>	

## Year Four

Semester 7						Semester 8					
Code	Course Title	Units			Prerequisites	Code	Course Title	Units			Prerequisites
Mandatory	Student must do the following courses	Lec.	Prac.	Credits		Mandatory	Student must do the following courses	Lec.	Prac.	Credits	
MG 420	Quaternary Geology	3	-	3	MG 220 + MG 321 + MG 323	MG 424	Marine Mineral Resources	2	-	2	MG 322
MG 421	Marine Sequence Stratigraphy	1	3	2	MG 220	MG 425	Paleoceanography	2	3	3	MG 322 + MG 423
MG 422	Remote Sensing & GIS in Marine Geology	2	3	3	MSC 205	MG 426	Applied Marine Geophysics	2	3	3	MG 324
MG 423	Geochemistry of marine sediments	2	3	3	MG 220 + MG 322	MG 427	Geology of Deep-Sea	2	-	2	-
EPS 202	Introduction to Petroleum Geology	2	-	2	EMR 111	MG 499	Research Project	4	-	4	-
Elective	Student may select from the elective courses	-	-	4	-	Elective	Student may select from the elective courses	-	-	4	-
<b>Total</b>				<b>17</b>		<b>Total</b>				<b>18</b>	

## Elective Courses

Code	Course Title	Units			Prerequisites
Elective	Student may select 8 credits from 28 credits	Lec.	Prac.	Credits	
MS 201	Oceanography	3	-	3	-
MG 428	Special topics 1	2	-	2	-
MG 429	Special topics 2	2	-	2	-
MG 430	Marine Geology Seminar	1	-	1	-
MG 431	Specialized training	1	3	2	-
MG 432	Marine Geohazard	2	-	2	-
EPS 312	Drilling	1	3	2	EPS 202
EPS 340	Well logging	1	3	2	EPS 202
EPS 344	Subsurface Geology	1	3	2	EPS 202
EEG201	Introduction to Engineering and Environmental Geology	2	-	2	EMR 111
MC 446	Water quality	1	3	2	MSC 201
MP 365	Integrated Coastal Zone Management	2	-	2	-
MB 312	Principles of Aquaculture	2	-	2	MB 101
MP 465	Near-Shore Physical Processes	2	-	2	-
<b>Total</b>				<b>28</b>	

## B. Sc. Marine Physics Program

### Program Structure and Organization

#### Year One

Semester 1					
Code	Course Title	Units			Prerequisites
		Lec.	Prac.	Credits	
Mandatory	Student must do the following courses				
MATH 110	Mathematics	3	-	3	-
MP 101	Essentials of Marine Physics	2	3	3	-
ELIS 101	Intensive English (1)	15	-	3	-
ARAB 101	Arabic Language	3	-	3	-
MG 101	Essentials of Marine Geology	2	3	3	-
<b>Total</b>				<b>15</b>	

Semester 2					
Code	Course Title	Units			Prerequisites
		Lec.	Prac.	Credits	
Mandatory	Student must do the following courses				
MS 101	Academic Skills in Marine Sciences	3	-	3	-
MC 101	Essentials of Marine Chemistry	2	3	3	-
MB 101	Essentials of Marine Biology	2	3	3	-
ELIS 102	Intensive English (2)	15	-	3	ELIS 101
ARAB 201	Arabic Language	3	-	3	ARAB 101
<b>Total</b>				<b>15</b>	

#### Year Two

Semester 3					
Code	Course Title	Units			Prerequisites
		Lec.	Prac.	Credits	
Mandatory	Student must do the following courses				
ISLS 101	Islamic Culture (1)	2	-	2	-
MSC 201	An Introduction to Marine Pollution	2	-	2	-
MSC 202	Dynamics of Marine Ecosystems	2	-	2	-
MS 202	Marine Ecology	3	-	3	MB 101 + MG 101 + MP 101 + MC 101
CPIT110	Problem solving and programing	3	-	3	-
PHYS 110	General Physics	3	-	3	-
	Free Course	-	-	2	-
<b>Total</b>				<b>17</b>	

Semester 4					
Code	Course Title	Units			Prerequisites
		Lec.	Prac.	Credits	
Mandatory	Student must do the following courses				
ISLS 201	Islamic Culture (2)	2	-	2	ISLS 101
MSC 203	Statistical techniques for Oceanographers	2	3	3	MATH 110
MSC 204	Oceanographic Data Processing	2	3	3	-
MSC 205	An Introduction to Remote Sensing in Marine Environment	2	-	2	-
MSC 206	An Introduction to Integrated Coastal Zone Management	2	-	2	-
MSC 207	Marine Resources	2	3	3	-
	Free Course	-	-	2	-
<b>Total</b>				<b>17</b>	

#### Year Three

Semester 5					
Code	Course Title	Units			Prerequisites
		Lec.	Prac.	Credits	
Mandatory	Student must do the following courses				
ISLS 301	Islamic Culture (3)	2	-	2	ISLS 201
MSC 307	Environmental impact assessment	2	3	3	MSC 206
MP 360	Marine Meteorology	2	3	3	MP 101
MP 361	Hydrography and water masses	2	3	3	MP 101
MATH 202	Calculus (II)	3	-	3	MATH 110
Elective	Student may select from the following courses	-	-	4	-
<b>Total</b>				<b>18</b>	

Semester 6					
Code	Course Title	Units			Prerequisites
		Lec.	Prac.	Credits	
Mandatory	Student must do the following courses				
ISLS 401	Islamic Culture (4)	2	-	2	ISLS 301
MSC 308	Cooperative and Field Training	1	3	2	MSC 207 + MSC 307
PHYS 203	General Physics (3)	4	-	4	MATH 110+ PHYS 110
MATH 203	Calculus (III)	3	-	3	MATH 110
MP 362	Air-Sea Interaction	2	3	3	MATH 202 + MP 360
MP 363	Dynamical Oceanography (I)	2	3	3	MATH 202+ MP 360
	Free Course	-	-	1	-
<b>Total</b>				<b>18</b>	

## Year Four

Semester 7						Semester 8					
Code	Course Title	Units			Prerequisites	Code	Course Title	Units			Prerequisites
Mandatory	Student must do the following courses	Lec.	Prac.	Credits		Mandatory	Student must do the following courses	Lec.	Prac.	Credits	
MP 460	Ocean Circulation	2	3	3	MATH 202 + MP 361	MP 465	Near-Shore Physical Processes	2	-	2	-
MP 461	Waves and Tide	2	3	3	MATH 203 + PHYS 203	MP 466	Dynamical Oceanography (II)	2	3	3	MP 363
MP 462	Physical Oceanography of Adjacent Seas	2	-	2	MP 363	MP 499	Research Project	4	-	4	-
MP 463	Mean Sea Level : Measurements and Prediction	2	-	2	-						
MP 464	Modeling of Marine Dynamics	2	3	3	MATH 203 + MP 363						
Elective	Students may select from the elective courses	-	-	5	-	Elective	Students may select from the elective courses	-	-	5	-
<b>Total</b>				<b>18</b>		<b>Total</b>				<b>14</b>	

## Elective Courses

Code	Course Title	Units			Prerequisites
Elective	Student may select 14 credits from 42 credits	Lec.	Prac.	Credits	
MS 201	Oceanography	3	-	3	-
MP 467	Remote Sensing in Physical Oceanography	2	3	3	PHYS 203 + MP 460
MP 468	Special Topics in Physical Oceanography 2	2	-	2	-
MB 313	Principles of Swimming and Diving	1	3	2	-
MB 312	Principles of Aquaculture	2	-	2	MB 101
MC 446	Water quality	1	3	2	MSC 201
MP 469	Marine Acoustics	2	3	3	PHYS 203 + MP361
MP 364	Special Topics in Physical Oceanography 1	2	-	2	-
MP 365	Integrated Coastal Zone Management	2	-	2	-
MG 326	Coastal Zone Geology	2	3	3	-
MSS 220	Fundamental of Surveying	2	3	3	MATH 202
PHYS 252	Classical Mechanics	3	-	3	PHYS 110 + MATH 202
MATH 204	Differential Equations (1)	3	-	3	MATH202
MATH 241	Linear Algebra	3	-	3	MATH110
MATH 305	Differential Equations (2)	3	-	3	MATH 204 + MATH 205 + MATH 241
MATH 205	Series and Vector Analysis	3	-	3	MATH 202+ MATH 203
<b>Total</b>				<b>42</b>	

## The specialization and job opportunities

### 1. Specialization:

The faculty awards B.Sc. degrees in the following four majors: marine biology, marine chemistry, marine geology, marine physics; after the student successful completion of the specialization requirements according to the academic plan of the program. The student assignment to one of the faculty specialized B.Sc. programs is made after the completion of the third semester, according to the request of the student and the conditions of admission to the program.

### 2. Skills, Scientific experiences, and acquired benefits in the specialization field:

#### 1) Specialization field: Marine Biology

- Familiarity with different marine environments and the ability to classify living organisms
- Familiarity with the factors affecting spatial and temporal distributions of marine living resources of all kinds
- Familiarity with the latest methods and techniques used in the fields of fish farming of all kinds
- Familiarity with the latest methods and mechanisms used in fishing and control of fish stocks
- Ability to take measurements and collect samples and preserve them in appropriate ways and analyze them according to modern methods
- Ability to assess the environmental impacts of natural factors and those resulting from human activity

#### Job opportunities for specialization field: Marine Biology

- Ministry of Environment, Water and Agriculture:
  - Ministry Deputy for Environment
  - Ministry Deputy for Agriculture (Fisheries)
  - General Authority for Meteorology and Environmental Protection
  - Saudi Wild Life Authority

- Petroleum and Petrochemicals Companies
- Fisheries and Aquaculture Companies
- Seawater Desalination Establishments
- Research Institutes and Centers

## 2) **Specialization field: Marine Chemistry**

- Familiarity with chemical reactions occurring at sea, their causes and their products
- Knowledge of biogeochemical processes that affect spatial and temporal distributions of elements in the sea
- Familiarity with the latest methods used to extract natural products from the sea and ways to benefit from them
- Familiarity with the latest methods and techniques used in chemical analysis of sea water and sediments
- Ability to take measurements and collect samples and preserve them in appropriate ways and analyze them according to modern methods
- Ability to identify the types of various chemical pollutants at sea and to determine the most appropriate ways to combat them

### **Job opportunities for specialization field: Marine Chemistry**

- Ministry of Environment, Water and Agriculture
  - Ministry Deputy for Environment
  - General Authority for Meteorology and Environmental Protection
  - Saudi Wild Life Authority
- Petroleum and Petrochemicals Companies
- Natural Products Companies
- Seawater Desalination Establishments
- Research Institutes and Centers

### 3) **Specialization field: Marine Geology**

- Familiarity with the origin and development of seas and oceans through the geological ages
- Familiarity with geological processes causing earthquakes and volcanoes that occur in seas and oceans
- Familiarity with the latest methods of exploration and exploitation of offshore oil and gas reservoirs and minerals
- Familiarity with the modern methods and techniques used in facies analysis of rocks and marine sediments
- Ability to conduct marine geological surveys, collect, describe, store and analyze them according to standard methods
- The ability to understand coastal changes and monitoring the impacts of the physical processes

### **Job opportunities for specialization field: Marine Geology**

- Ministry of Defense
  - General Directorate for Military Survey
- Ministry of Energy, Industry and Mineral Resources
- Saudi Geological Survey
- General Commission for Survey
- Oil, Gas and Minerals Exploration Companies
- Hydrographic and Geophysical Survey Companies
- Research Institutes and Centers

### 4) **Specialization field: Marine Physics**

- Familiarity with the different types of interaction between the sea and the atmosphere and its implications
- Familiarity with spatial and temporal distributions of the physical properties of sea water and

water masses

- Familiarity with the various kinds of currents, waves and tides and their dimensions and dynamics
- Familiarity with the latest methods and techniques used in remote sensing of marine physical phenomena
- The ability to take measurements in temporal and spatial dimensions and analyze them numerically according to modern methods of operation
- The ability to predict currents, waves and tides using experimental equations and numerical models

**Job opportunities for specialization field: Marine Physics**

- Ministry of Defense
  - Royal Saudi Naval Forces
  - General Directorate for Military Survey
- Ministry of Interior
  - General Directorate for Boarder Guard
- Ministry of Environment, Water and Agriculture
  - General Authority for Meteorology and Environmental Protection
- General Commission for Survey
- Oil, Gas and Minerals Exploration Companies
- Hydrographic and Geophysical Survey Companies
- Research Institutes and Centers



## -- Faculty Members --

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