



جامعة الإمام عبد الرحمن بن فيصل
IMAM ABDULRAHMAN BIN FAISAL UNIVERSITY

الحياة تحت
الماء



SDG 14

Life Below
Water

Sustainable
Development Report

2022-2023

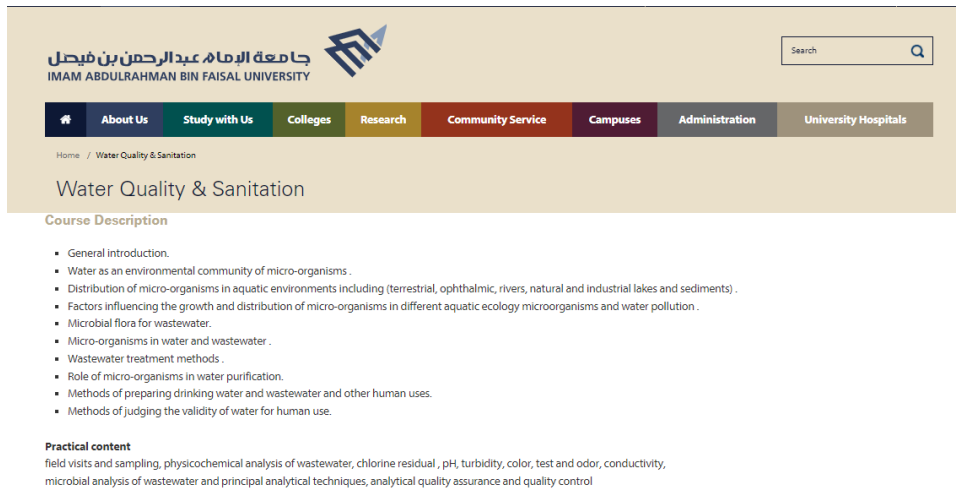
Table of Contents

1.	Water Quality & Sanitation	2
2.	Ground Water Engineering and Contamination	3
3.	Water Quality.....	4
4.	Environmental Impact Assessment.....	10
5.	Marine Pollution & Control.....	15
6.	Fisheries & Aquaculture.....	21
7.	Research On Life below Water.....	22

1. Water Quality & Sanitation

Course Description

- General introduction.
- Water as an environmental community of micro-organisms .
- Distribution of micro-organisms in aquatic environments including (terrestrial, ophthalmic, rivers, natural and industrial lakes and sediments) .
- Factors influencing the growth and distribution of micro-organisms in different aquatic ecology microorganisms and water pollution .
- Microbial flora for wastewater.
- Micro-organisms in water and wastewater .
- Wastewater treatment methods .
- Role of micro-organisms in water purification.
- Methods of preparing drinking water and wastewater and other human uses.
- Methods of judging the validity of water for human use.



The screenshot shows the website header for Imam Abdulrahman Bin Faisal University. It includes a search bar, a navigation menu with items like 'About Us', 'Study with Us', 'Colleges', 'Research', 'Community Service', 'Campuses', 'Administration', and 'University Hospitals'. The main content area is titled 'Water Quality & Sanitation' and contains a 'Course Description' section with a bulleted list of topics and a 'Practical content' section.

Course Description

- General introduction.
- Water as an environmental community of micro-organisms.
- Distribution of micro-organisms in aquatic environments including (terrestrial, ophthalmic, rivers, natural and industrial lakes and sediments).
- Factors influencing the growth and distribution of micro-organisms in different aquatic ecology microorganisms and water pollution.
- Microbial flora for wastewater.
- Micro-organisms in water and wastewater.
- Wastewater treatment methods.
- Role of micro-organisms in water purification.
- Methods of preparing drinking water and wastewater and other human uses.
- Methods of judging the validity of water for human use.


Practical content
 field visits and sampling, physicochemical analysis of wastewater, chlorine residual, pH, turbidity, color, test and odor, conductivity, microbial analysis of wastewater and principal analytical techniques, analytical quality assurance and quality control

<https://www.iau.edu.sa/en/courses/water-quality-sanitation>

2. Ground Water Engineering and Contamination

Course Description

This course will give a broad background of the area of ground water engineering and contamination and the following topics will be presented to the students: sources and types of groundwater contamination, contamination transport mechanisms, sorption and other chemical reactions, the numerical modeling of contaminant transport, non-aqueous phase liquids, groundwater remediation and design and basic definitions of terms used in this area of expertise. The students will also become knowledgeable in the following subjects: occurrence of ground water, ground water exploration, specifications, estimations of quantities, types of ground water aquifers, basic studies and investigations, ground water flow, hydraulics of ground water, well hydraulics, estimation of well discharges, observation wells, well design, well development, ground water quality as well as contaminant, transport management and remediation. The students will receive an introduction to ground water modeling and become familiar with the state of ground water in the Kingdom.



جامعة الإمام عبد الرحمن بن فيصل
IMAM ABDULRAHMAN BIN FAISAL UNIVERSITY

Search Q

About Us

Study with Us

Colleges

Research

Community Service

Campuses

Administration

University Hospitals

Home / Ground Water Engineering and Contamination


Ground Water Engineering and Contamination

Course Description

This course will give a broad background of the area of ground water engineering and contamination and the following topics will be presented to the students: sources and types of groundwater contamination, contamination transport mechanisms, sorption and other chemical reactions, the numerical modeling of contaminant transport, non-aqueous phase liquids, groundwater remediation and design and basic definitions of terms used in this area of expertise. The students will also become knowledgeable in the following subjects: occurrence of ground water, ground water exploration, specifications, estimations of quantities, types of ground water aquifers, basic studies and investigations, ground water flow, hydraulics of ground water, well hydraulics, estimation of well discharges, observation wells, well design, well development, ground water quality as well as contaminant, transport management and remediation. The students will receive an introduction to ground water modeling and become familiar with the state of ground water in the Kingdom.

Course ID: ENVEN 573

Credit hours	Theory	Practical	Laboratory	Lecture	Studio	Contact hours	Pre-requisite
3	3					3	NONE



<https://www.iau.edu.sa/en/courses/ground-water-engineering-and-contamination>

3. Water Quality

Course Title:	Water Quality
Course Code:	ENVEN 352
Program:	BSc Environmental Engineering
Department:	Environmental Engineering
College:	College of Engineering
Institution:	Imam Abdulrahman Bin Faisal University

Table of Contents

A. Course Identification	3
6. Mode of Instruction (mark all that apply)	3
B. Course Objectives and Learning Outcomes	3
1. Course Description	3
2. Course Main Objective	3
3. Course Learning Outcomes	3
C. Course Content	4
D. Teaching and Assessment	4
1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods	4
2. Assessment Tasks for Students	5
E. Student Academic Counseling and Support	5
F. Learning Resources and Facilities	5
1. Learning Resources	5
2. Facilities Required	5
G. Course Quality Evaluation	6
H. Specification Approval Data	6

Course Description

The Water Quality course will cover the following topics: the standard methods of assessing water quality; practical approaches in solving water-related problems, field methods used to sample and assess various biological, physical and chemical components in water resources as well as the impact of human activity on aquatic environments. Standard sampling techniques, detection, identification and quantification of biological specimens and chemical pollutants in the aquatic environment will be discussed as well as: sustainable water management, sample preservation, safety, basic approaches to analyze and report findings with emphasis on methods currently practiced by government resource agencies. Guidelines and Saudi standards and regulations will be explained.



A. Course Identification

1. Credit hours:	2 Credit hours
2. Course type	
a.	University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" type="checkbox"/> Others <input type="checkbox"/>
b.	Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/>
3. Level/year at which this course is offered:	3 rd semester 3 rd year
4. Pre-requisites for this course (if any):	None
5. Co-requisites for this course (if any):	None

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom/Laboratory	20	66.6
2	Blended		
3	E-learning	15	33.3
4	Distance learning		
5	Other		35

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	35
2	Laboratory/Studio	
3	Tutorial	
4	Others (specify)	
	Total	35

B. Course Objectives and Learning Outcomes

1. Course Description:

Sources of water resources; quality principles, problems, and issues. Standard methods for assessing water quality; practical approaches in solving water-related problems. Field methods used to sample and assess various biological, physical, and chemical components in water resources Water quality monitoring and assessment, water quality statistical analysis and reporting, Standard sampling techniques, Sample preservation, and safety; Water quality modeling and applications; Saudi water quality standards, regulations, and guidelines.

2. Course Main Objectives

At the end of this course the student will be able to learn the key principles and main constituents of water quality management, the statistical methods and their applications in water quality management, understand the principles of techniques for monitoring the chemical, hydrological and microbiological elements of water quality.

3. Course Learning Outcomes

SDG 14: Life Below Water

Course Learning Outcomes (CLOs)		Aligned PLOs [±]
2	Skills	
S1	an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	ABET SO 1 (S1)
3	Values:	
V2	an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts	ABET SO 4 (S1)

C. Course Content

No	List of Topics	Contact Hours
1	Water resources; principles of water quality; water quality characteristics	2
2	Global parameters for water quality assessments	4
3	Water quality regulations and policy development; standard methods of assessing water quality	4
4	Water quality standards: designated uses and numeric criteria development	4
5	Water sampling programs; sample preservation and safe field and laboratory measurements for water quality	2
6	Water quality monitoring and assessment	4
7	Statistical analysis; report for quality monitoring and assessment	4
8	Water quality modeling and applications	4
9	Saudi water quality standards, regulations, and guidelines.	2
Total		30

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	Skills		
1.1	an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	Student participation, discussion, and case studies.	Quizzes, exams, homework, and presentations
2.0	Values		
2.1	an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts	Student participation, discussion, and case studies.	Quizzes, exams, homework, and presentations

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Homework	Fortnightly	10%
2	Quizzes	Fortnightly	20%
3	Term project	Semester	20%
4	Mid-term exam	8th week	20%
5	Final Exam	Registrar scheduled	30%

*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice:

The instructor is available in his office for counseling and consultation. At least 3 hrs/week are devoted to students for consultation and academic advice.

In addition, to provide support to university students in the areas of academic, psychological, and social counseling, as well as tutoring classes and student activities through a unified electronic system (Student Support System) that ensures the quality and improvement of academic performance indicators of students.

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	1. Water Quality Concepts, Sampling, and Analyses 1st Edition 2010. Authors; Yuncong Li, Kati Migliaccio 2. Water Quality Monitoring Authors Jamie Bartram and Richard Ballance
Essential References Materials	1. Using Statistical Methods for Water Quality Management.. Issues, Problems and Solutions 2005. Author Graham B. McBride
Electronic Materials	Additional course materials such as design softwares, webpages, lecture notes etc., would be made available to students
Other Learning Materials	

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Lecture room equipped with a white board, computer, LCD projector, and internet connection. Computational Laboratory dedicated to this course in particular

SDG 14: Life Below Water

Item	Resources
Technology Resources (AV, data show, Smart Board, software, etc.)	An easily accessible computer laboratory with reasonable number of computers or stations (for each student per session) installed with required software
Other Resources	Central library and college library including main books and access to a large number of electronic sources

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Students' feedback on effectiveness of teaching delivery	Students	SSLS Survey - more than 75% satisfaction
Students' feedback on effectiveness of the course	Students	CES Survey - more than 75% satisfaction
Indirect assessment of course outcomes achievements by students	Students	Survey - more than 75% satisfaction
Direct assessment of course outcomes achievements by students	Faculty	Exams, quizzes, and assignments

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)

Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

Assessment Methods (Direct, Indirect)

4. Environmental Impact Assessment

Course Title:	Environmental Impact Assessment
Course Code:	ENVE 503
Program:	BSC Environmental Engineering
Department:	Environmental Engineering
College:	College of Engineering
Institution:	Imam Abdulrahman Bin Faisal University

Table of Contents

A. Course Identification	3
6. Mode of Instruction (mark all that apply)	3
B. Course Objectives and Learning Outcomes	3
1. Course Description	3
2. Course Main Objective	3
3. Course Learning Outcomes	4
C. Course Content	4
D. Teaching and Assessment	4
1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods	4
2. Assessment Tasks for Students	5
E. Student Academic Counseling and Support	5
F. Learning Resources and Facilities	5
1. Learning Resources	5
2. Facilities Required	6
G. Course Quality Evaluation	6
H. Specification Approval Data	6

Course Description

Assessing the potential impact of major developments on the environment in its broadest sense. Applying EIA to new infrastructure projects, such as power plants, desalination plants, refineries,

SDG 14: Life Below Water

highways, pipelines, dams, mines, airports, incinerators and landfills. Specialist areas of EIA application include water quality, minerals, waste, hydrology, air quality, landscape, visual impact, ecology, community and socio-economic aspects. The course is genuinely interdisciplinary, with involvement from staff from several departments and external speakers from industry and government.

A. Course Identification

1. Credit hours:	3hr
2. Course type	
a.	University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" type="checkbox"/> Others <input type="checkbox"/>
b.	Required <input type="checkbox"/> Elective <input checked="" type="checkbox"/>
3. Level/year at which this course is offered:	1st Semester – 5th Year
4. Pre-requisites for this course (if any):	None
5. Co-requisites for this course (if any):	None

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	30	66.6
2	Blended		
3	E-learning		
4	Distance learning	15	33.3
5	Other		

B. Course Objectives and Learning Outcomes

<p>1. Course Description</p> <p>This course give the new knowledge and skills to assess the potential impacts of major developments on the environment in its broadest sense. Applying EIA to new infrastructure projects, such as power plants, highways, pipelines, dams, mines, airports, incinerators and landfills. Specialist areas of EIA application include water quality, minerals, waste, hydrology, air quality, landscape, visual impact, ecology, community and socio-economic aspects. The course is genuinely interdisciplinary, with involvement of experts from industry and government.</p>
<p>2. Course Main Objective</p> <p>The main objective of this course is to provide main concepts and execution process of EIA for new infrastructure projects.</p>



3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge and Understanding	
1.1	Assessing the potential impacts of major developments on the environment in its broadest sense	ABET SO 4 (K1)
1.2	learning and understanding the principles, process, and necessary techniques for EIA, mitigation and monitoring processes	ABET SO 8 (K1)
2	Skills :	
2.1	Prediction of Environmental Impacts	ABET SO 5 (S1)
2.2	Apply EIA to the new project as a Case study.	ABET SO 10 (S2)
3	Values:	
3.1	Participation of students in classroom discussion and panel interviews.	ABET SO 7 (V1)
3.2	Student will take the responsibility to solve and submit given assignments on his own	ABET SO 6 (V2)

C. Course Content

No	List of Topics	Contact Hours
1	Introduction to EIA Studies	3
2	Overview on EIA Process, Guidelines Legislation Administrative	3
3	Screening, Scoping	3
4	Baseline Studies and alternatives, Impacts Analysis, Models	3
5	Mitigation	3
6	Reporting and Public Involvement	3
7	Monitoring	3
8	Midterm	3
9	EMP case study	3
10	Socio-economic impacts	3
11	Noise	3
12	Transport	3
13	Air Quality and Climate	3
14	Water	3
15	Ecology, KSA Regulations	3
16	Final Exam	3
Total		45

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	Knowledge and Understanding		
1.1	Assessing the potential impacts of major developments on the environment in its broadest sense.	Student participation, discussion, and case studies.	Quizzes, exams, homework

SDG 14: Life Below Water

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.2	learning and understanding the principles, process, and necessary techniques for EIA, mitigation and monitoring processes	Student participation, discussion, and case studies.	Quizzes, exams, homework
2.0	Skills		
2.1	Prediction of Environmental Impacts	Student participation, discussion, and case studies.	Quizzes, exams, homework
2.2	Apply EIA to the new project as a Case study.	Student participation, discussion, and case studies.	Term papers and presentations
3.0	Values		
3.1	Participation of students in classroom discussion and panel interviews.	Student participation, discussion, and case studies.	Quizzes, exams, homework
3.2	Student will take the responsibility to solve and submit given assignments on his own	Student participation, discussion, and case studies.	Quizzes, exams, homework

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Quizzes	Every week	15%
2	Term paper	Last week	15%
3	Mid-term exam	8 th week	30%
4	Final Exam	As scheduled by the registrar	40%

*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice:

The instructor is available in his office for counseling and consultation. At least 3 hrs/week are devoted to students for consultation and academic advice.

In addition, to provide support to university students in the areas of academic, psychological, and social counseling, as well as tutoring classes and student activities through a unified electronic system (Student Support System) that ensures the quality and improvement of academic performance indicators of students.

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	Methods of Environmental Impact Assessment Third edition Edited by Peter Morris and Riki Therivel, Taylor and Francis, UK, 2009
Essential References Materials	Lee, Norman and George, Clive 2000. Environmental Assessment in Developing and Transitional Countries. John Wiley and Sons, Chichester, UK. <ul style="list-style-type: none"> http://www.momra.gov.sa/GeneralServ/Specs/list012.asp. Selected handouts and reference materials on course subjects will be provided as part of course material.
Electronic Materials	<ul style="list-style-type: none"> http://www.epa.gov/owow/oceans/ http://www.eia.doe.gov/ http://www.unep.org http://gesamp.imo.org/ http://www.orf.org/futureprojects.html http://www.envirolink.org/

Other Learning Materials	The instructor may provide some relevant materials and learning aids
---------------------------------	--

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Lecture room equipped with a white board, computer and LCD projector or plasma screen and internet connection.
Technology Resources (AV, data show, Smart Board, software, etc.)	An easily accessible computer laboratory with reasonable number of computers or stations (for each student per session).
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Not applicable.

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Students' feedback on effectiveness of teaching delivery	Students	SSLS Survey - more than 75% satisfaction
Students' feedback on effectiveness of the course	Students	CES Survey - more than 75% satisfaction
Indirect assessment of course outcomes achievements by students	Students	Survey - more than 75% satisfaction
Direct assessment of course outcomes achievements by students	Faculty	Exams, quizzes, and assignments

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)

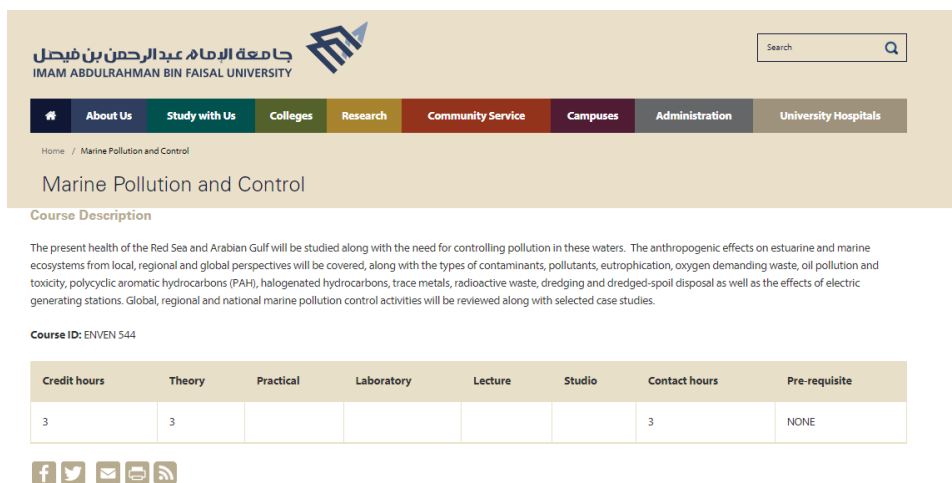
Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	Environmental Engineering Department Council
Reference No.	Department Meeting Minutes No:3
Date	03.10.2022

5. Marine Pollution & Control



The screenshot shows the course page for "Marine Pollution and Control" (ENVEN 544) on the university's website. The page includes a navigation menu, a search bar, and a course description. The description states that the course will study the health of the Red Sea and Arabian Gulf, focusing on anthropogenic effects on estuarine and marine ecosystems. It covers local, regional, and global perspectives, including contaminants, pollutants, eutrophication, oxygen demanding waste, oil pollution, and toxicity. It also discusses polycyclic aromatic hydrocarbons (PAHs), halogenated hydrocarbons, trace metals, radioactive waste, dredging and dredged-spoil disposal, and the effects of electric generating stations. Global, regional, and national marine pollution control activities will be reviewed along with selected case studies.

Course ID: ENVEN 544

Credit hours	Theory	Practical	Laboratory	Lecture	Studio	Contact hours	Pre-requisite
3	3					3	NONE

Below the table are social media icons for Facebook, Twitter, Email, Print, and RSS.

Course Title:	Marine Pollution & Control
Course Code:	ENVEN 544
Program:	Environmental Engineering
Department:	Environmental Engineering
College:	College of Engineering
Institution:	Imam Abdulrahman bin Faisal University



Table of Contents

A. Course Identification	3
6. Mode of Instruction (mark all that apply)	3
B. Course Objectives and Learning Outcomes	3
1. Course Description	3
2. Course Main Objective	3
3. Course Learning Outcomes	4
C. Course Content	4
D. Teaching and Assessment	4
1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods	4
2. Assessment Tasks for Students	5
E. Student Academic Counseling and Support	5
F. Learning Resources and Facilities	5
1. Learning Resources	6
2. Facilities Required	6
G. Course Quality Evaluation	6
H. Specification Approval Data	7

Course Description

The present health of the Red Sea and Arabian Gulf will be studied along with the need for controlling pollution in these waters. The anthropogenic effects on estuarine and marine ecosystems from local, regional and global perspectives will be covered, along with the types of contaminants, pollutants, eutrophication, oxygen demanding waste, oil pollution and toxicity, polycyclic aromatic hydrocarbons (PAH), halogenated hydrocarbons, trace metals, radioactive waste, dredging and dredged-spoil disposal as well as the effects of electric generating stations. Global, regional and national marine pollution control activities will be reviewed along with selected case studies.



A. Course Identification

1. Credit hours:	3 Credit hours			
2. Course type				
a.	University <input type="checkbox"/>	College <input type="checkbox"/>	Department <input checked="" type="checkbox"/>	Others <input type="checkbox"/>
b.	Required <input type="checkbox"/>	Elective <input checked="" type="checkbox"/>		
3. Level/year at which this course is offered:	Level 9 or Level 10			
4. Pre-requisites for this course (if any):	None			
5. Co-requisites for this course (if any):	None			

B. Course Objectives and Learning Outcomes

1. Course Description
The course provides students with an overview of various forms of environmental pollution as they affect both the land and maritime environment. Understanding the impacts of pollution on marine ecosystems. Interactions between major types of pollution generated by ships on marine fauna, flora, and habitats. Understand the laws, associated regulations, and implementing policies that address vessel-source marine pollution due to operational discharges, dumping of waste at sea, and accidental pollution of the marine environment, Role of microorganisms as causes and indicators of toxicity. Modeling and fate of pollution in marine and coastal environments.
2. Course Main Objective
This course main objective is to know the national, regional and international policies, laws and regulations relevant to the protection and conservation of marine ecosystem. In addition to that identify the source, sinks, fate, transport and effects of different pollutants on coastal and open marine ecosystems and apply strategies and approaches designed to reduce marine pollution



3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge and Understanding	
1.1	Understand and identify the source, sinks, fate, transport and effects of different pollutants on coastal and open marine ecosystems	K1 (ABET SO7)
1.2	Understand and explain strategies and approaches designed to reduce marine pollution	K1 (ABET SO7)
1.3	Know the various policies, laws and regulations on National Regional and European level relevant to the protection and/or conservation of marine waters	K1 (ABET SO7)
2	Skills :	
2.1	Apply modern methodologies and techniques for assessment, monitoring and treatment of marine and coastal pollution	S4 (ABET SO5)
3	Values:	
3.1	Ability to interact with others in interdisciplinary sciences	V1 (ABET SO4)

C. Course Content

No	List of Topics	Contact Hours
1	Introduction to marine pollution	3
2	Organic pollution: sources and effects	6
3	Oil pollution: sources and ecological impacts	6
4	Oil pollution: oil spills	3
5	Halogenated Hydrocarbons	3
6	Dredging and solid waste	3
7	Case Study of Marine Pollution	6
8	Radioactivity	3
9	Fate and transport of pollutants	6
10	Modelling pollutants dispersion	6
Total		45

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	Knowledge and Understanding		
1.1	Understand and identify the source, sinks, fate, transport and effects of different pollutants on coastal and open marine ecosystems	In-class questions and answers, pre reading discussion, and case studies.	Quizzes, exams, homework
1.2	Understand and explain strategies and approaches designed to reduce marine pollution	Structured course materials delivered through a sequential of lectures, videos,	Quizzes, exams, homework

SDG 14: Life Below Water

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
		presentations, and research.	
1.3	Know the various policies, laws and regulations on National Regional and European level relevant to the protection and/or conservation of marine waters	Lecturing, pre reading Student participation, discussion, and case studies.	Quizzes, exams, homework
2.0	Skills		
2.1	Apply modern methodologies and techniques for assessment, monitoring and treatment of marine and coastal pollution	Lecturing, pre reading Student participation, discussion, and case studies.	Assignments, presentations Case study
3.0	Values		
3.1	Ability to interact with others in interdisciplinary sciences	Student participation, discussion, and case studies.	Group work and presentations
...			

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	HW1	3	3
2	HW2	6	3
3	HW3	9	4
4	Term paper and presentation	11	20
5	Midterm exam	10	20
6	Quiz 1	4	3
7	Quiz 2	8	3
8	Quiz 3	12	4
	Final exam	16	40

*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice:

The instructor is available in his office for counseling and consultation. At least 3 hrs/week are devoted to students for consultation and academic advice.

In addition, to provide support to university students in the areas of academic, psychological, and social counseling, as well as tutoring classes and student activities through a unified electronic system (Student Support System) that ensures the quality and improvement of academic performance indicators of students.

<https://www.iau.edu.sa/en/administration/offices-of-the-vice-presidents/office-of-the-vice-president-for-academic-affairs/projects/student-support>

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	R. B. Clark, Marine Pollution, Oxford University Press, USA; Fifth Edition, 2001
Essential References Materials	Handbook on Marine Environment Protection Science, Impacts and Sustainable Management. Editors: Markus Salomon, Till Markus, © 2018
Electronic Materials	Marine Coastal and Water Pollutions: Oil Spill Studies, edited by F. Muttin, John Wiley & Sons, Incorporated, 2014.
Other Learning Materials	

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Lecture room equipped with a whiteboard, computer, LCD projector, and internet connection, zoom.
Technology Resources (AV, data show, Smart Board, software, etc.)	Needed software is available free or at PC labs eLearning software re available such as Zoom and Teams.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	The central library and college library including main books, eBooks, and access to a large number of electronic sources

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Students/Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources	Program coordinator	Direct and Indirect Quizzes, exams, homework, presentations
Program/Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources	Students	Indirect/ CES, SSLS surveys
Staff/Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources	Students and Committee	Indirect/ satisfaction surveys. CES, SSLS surveys

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)

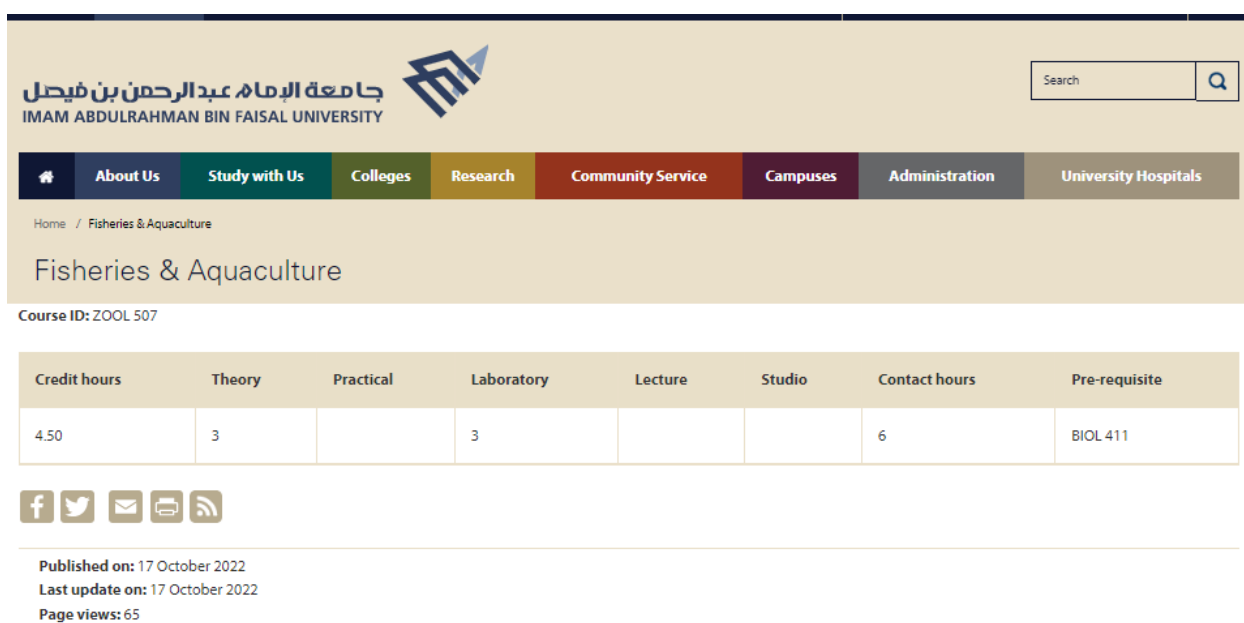
Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	Environmental Engineering Department Council
Reference No.	Department Meeting Minutes No:3
Date	03.10.2022

6. Fisheries & Aquaculture



جامعة الإمام عبد الرحمن بن فيصل
IMAM ABDULRAHMAN BIN FAISAL UNIVERSITY

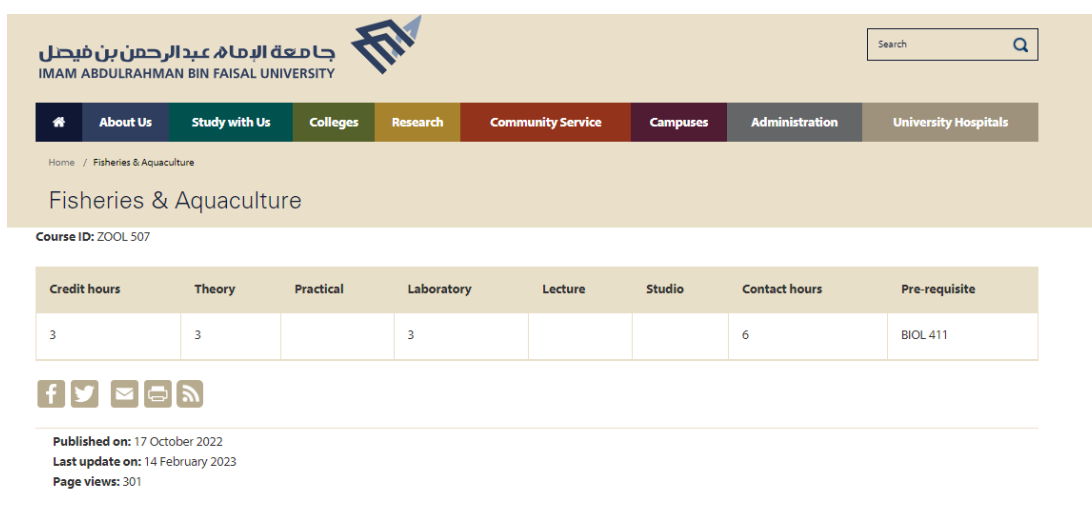
Home / Fisheries & Aquaculture

Fisheries & Aquaculture

Course ID: ZOO 507

Credit hours	Theory	Practical	Laboratory	Lecture	Studio	Contact hours	Pre-requisite
4.50	3		3			6	BIOL 411

Published on: 17 October 2022
Last update on: 17 October 2022
Page views: 65



جامعة الإمام عبد الرحمن بن فيصل
IMAM ABDULRAHMAN BIN FAISAL UNIVERSITY

Home / Fisheries & Aquaculture

Fisheries & Aquaculture

Course ID: ZOO 507

Credit hours	Theory	Practical	Laboratory	Lecture	Studio	Contact hours	Pre-requisite
3	3		3			6	BIOL 411

Published on: 17 October 2022
Last update on: 14 February 2023
Page views: 301

7. Research On Life below Water

Article Title	Link	Research Area	Vol.
Mangrove forests as traps for marine litter	https://www.webofscience.com/api/gateway?GWVersion=2&SrcAuth=InCites&SrcApp=tsm_test&DestApp=WOS_CPL&DestLinkType=FullRecord&KeyUT=ISI:000460844800054	ENVIRONMENTAL SCIENCES	247
Biosynthesis of silver nanoparticles by using of the marine brown alga Padina pavonia and their characterization	https://www.webofscience.com/api/gateway?GWVersion=2&SrcAuth=InCites&SrcApp=tsm_test&DestApp=WOS_CPL&DestLinkType=FullRecord&KeyUT=ISI:000483366900017	BIOLOGY	26
Carbon stocks and accumulation rates in Red Sea seagrass meadows	https://www.webofscience.com/api/gateway?GWVersion=2&SrcAuth=InCites&SrcApp=tsm_test&DestApp=WOS_CPL&DestLinkType=FullRecord&KeyUT=ISI:000446803100001	MARINE & FRESHWATER BIOLOGY	8
Stable Isotope (delta C-13, delta N-15, delta O-18, delta D) Composition and Nutrient Concentration of Red Sea Primary Producers	https://www.webofscience.com/api/gateway?GWVersion=2&SrcAuth=InCites&SrcApp=tsm_test&DestApp=WOS_CPL&DestLinkType=FullRecord&KeyUT=ISI:000457370800001	MARINE & FRESHWATER BIOLOGY; ENVIRONMENTAL SCIENCES	5
Source, distribution and emerging threat of micro- and nanoplastics to marine organism and human health: Socio-economic impact and management strategies	https://www.webofscience.com/api/gateway?GWVersion=2&SrcAuth=InCites&SrcApp=tsm_test&DestApp=WOS_CPL&DestLinkType=FullRecord&KeyUT=ISI:000639328800136	PUBLIC, ENVIRONMENTAL & OCCUPATIONAL HEALTH; ENVIRONMENTAL SCIENCES	195
Environmental impacts of heavy metals, rare earth elements and natural radionuclides in marine sediment from Ras Tanura, Saudi Arabia along the Arabian Gulf	https://www.webofscience.com/api/gateway?GWVersion=2&SrcAuth=InCites&SrcApp=tsm_test&DestApp=WOS_CPL&DestLinkType=FullRecord&KeyUT=ISI:000423642800015	NUCLEAR SCIENCE & TECHNOLOGY; CHEMISTRY, INORGANIC & NUCLEAR; RADIOLOGY, NUCLEAR MEDICINE & MEDICAL IMAGING	132

Fuzzy MCDM-based GIS model for subsea oil pipeline route optimization: An integrated approach	https://www.webofscience.com/api/gateway?GWVersion=2&SrcAuth=InCites&SrcApp=tsm_test&DestApp=WOS_CPL&DestLinkType=FullRecord&KeyUT=ISI:00040891280008	MINING & MINERAL PROCESSING; OCEANOGRAPHY; ENGINEERING, OCEAN; ENGINEERING, GEOLOGICAL	35
Tumoricidal and Bactericidal Properties of ZnONPs Synthesized Using Cassia auriculata Leaf Extract	https://www.webofscience.com/api/gateway?GWVersion=2&SrcAuth=InCites&SrcApp=tsm_test&DestApp=WOS_CPL&DestLinkType=FullRecord&KeyUT=ISI:000557831400001	BIOCHEMISTRY & MOLECULAR BIOLOGY	10
Stunted Mangrove Trees in the Oligotrophic Central Red Sea Relate to Nitrogen Limitation	https://www.webofscience.com/api/gateway?GWVersion=2&SrcAuth=InCites&SrcApp=tsm_test&DestApp=WOS_CPL&DestLinkType=FullRecord&KeyUT=ISI:000556191000001	MARINE & FRESHWATER BIOLOGY; ENVIRONMENTAL SCIENCES	7
Response of nonlinear offshore spar platform under wave and current	https://www.webofscience.com/api/gateway?GWVersion=2&SrcAuth=InCites&SrcApp=tsm_test&DestApp=WOS_CPL&DestLinkType=FullRecord&KeyUT=ISI:000415392300024	ENGINEERING, MARINE; ENGINEERING, OCEAN; OCEANOGRAPHY; ENGINEERING, CIVIL	144
Deep Seabed Mining: A Note on Some Potentials and Risks to the Sustainable Mineral Extraction from the Oceans	https://www.webofscience.com/api/gateway?GWVersion=2&SrcAuth=InCites&SrcApp=tsm_test&DestApp=WOS_CPL&DestLinkType=FullRecord&KeyUT=ISI:000662384000001	OCEANOGRAPHY; ENGINEERING, MARINE; ENGINEERING, OCEAN	9
An integrated framework for inventory management and transportation of refined petroleum products: Pipeline or marine?	https://www.webofscience.com/api/gateway?GWVersion=2&SrcAuth=InCites&SrcApp=tsm_test&DestApp=WOS_CPL&DestLinkType=FullRecord&KeyUT=ISI:000423005800015	MATHEMATICS, INTERDISCIPLINARY APPLICATIONS; ENGINEERING, MULTIDISCIPLINARY; MECHANICS	55
Leaf Nutrient Resorption and Export Fluxes of Avicennia marina in the Central Red Sea Area	https://www.webofscience.com/api/gateway?GWVersion=2&SrcAuth=InCites&SrcApp=tsm_test&DestApp=WOS_CPL&DestLinkType=FullRecord&KeyUT=ISI:000457159300001	MARINE & FRESHWATER BIOLOGY; ENVIRONMENTAL SCIENCES	5



Floating spar platform as an ultra-deepwater structure in oil and gas exploration	https://www.webofscience.com/api/gateway?GWVersion=2&SrcAuth=InCites&SrcApp=tsm_test&DestApp=WOS_CPL&DestLinkType=FullRecord&KeyUT=ISI:000402987000004	ENGINEERING, MARINE	12
MEASUREMENT OF RADON EXHALATION RATE AND ANNUAL EFFECTIVE DOSE FROM MARINE SEDIMENTS, RAS TANURA, SAUDI ARABIA, USING CR-39 DETECTORS	https://www.webofscience.com/api/gateway?GWVersion=2&SrcAuth=InCites&SrcApp=tsm_test&DestApp=WOS_CPL&DestLinkType=FullRecord&KeyUT=ISI:000466102900011	PHYSICS, MULTIDISCIPLINARY	64
Eco-friendly larvicide of Amphora coffeaeformis and Scenedesmus obliquus microalgae extracts against Culex pipiens	https://www.webofscience.com/api/gateway?GWVersion=2&SrcAuth=InCites&SrcApp=tsm_test&DestApp=WOS_CPL&DestLinkType=FullRecord&KeyUT=ISI:000633266700002	MARINE & FRESHWATER BIOLOGY; BIOTECHNOLOGY & APPLIED MICROBIOLOGY	33
Perceptions of Marine Environmental Issues by Saudi Citizens	https://www.webofscience.com/api/gateway?GWVersion=2&SrcAuth=InCites&SrcApp=tsm_test&DestApp=WOS_CPL&DestLinkType=FullRecord&KeyUT=ISI:000566551800001	MARINE & FRESHWATER BIOLOGY; ENVIRONMENTAL SCIENCES	7
Can be marine bioactive peptides (MBAs) lead the future of foodomics for human health?	https://www.webofscience.com/api/gateway?GWVersion=2&SrcAuth=InCites&SrcApp=tsm_test&DestApp=WOS_CPL&DestLinkType=FullRecord&KeyUT=ISI:000639006400001	NUTRITION & DIETETICS; FOOD SCIENCE & TECHNOLOGY	62
Transitory Change of Bacterial Community Structure in Hot Water Biofilm: Effects of Anti- Legionella Treatments	https://www.webofscience.com/api/gateway?GWVersion=2&SrcAuth=InCites&SrcApp=tsm_test&DestApp=WOS_CPL&DestLinkType=FullRecord&KeyUT=ISI:000435269400003	GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY; WATER RESOURCES; MARINE & FRESHWATER BIOLOGY; ENVIRONMENTAL SCIENCES	46
Internodal Analysis of Avicennia marina in the Western Arabian Gulf	https://www.webofscience.com/api/gateway?GWVersion=2&SrcAuth=InCites&SrcApp=tsm_test&DestApp=WOS_CPL&DestLinkType=FullRecord&KeyUT=ISI:000683312300001	MARINE & FRESHWATER BIOLOGY; ENVIRONMENTAL SCIENCES	8

Biogenic synthesis of gold nanoparticles using Sargassum tenerrimum and its evaluation of antibacterial activity against Escherichia coli and Salmonella typhi	https://www.webofscience.com/api/gateway?GWVersion=2&SrcAuth=InCites&SrcApp=tsm_test&DestApp=WOS_CPL&DestLinkType=FullRecord&KeyUT=ISI:000498626400020	OCEANOGRAPHY	48
Pharmacological Effects of Marine-Derived Enterococcus faecium EA9 against Acute Lung Injury and Inflammation in Cecal Ligated and Punctured Septic Rats	https://www.webofscience.com/api/gateway?GWVersion=2&SrcAuth=InCites&SrcApp=tsm_test&DestApp=WOS_CPL&DestLinkType=FullRecord&KeyUT=ISI:000771647400005	BIOTECHNOLOGY & APPLIED MICROBIOLOGY; MEDICINE, RESEARCH & EXPERIMENTAL	2021
Hydrodynamic Response of Floating Coupled Spar in Deep Sea	https://www.webofscience.com/api/gateway?GWVersion=2&SrcAuth=InCites&SrcApp=tsm_test&DestApp=WOS_CPL&DestLinkType=FullRecord&KeyUT=ISI:000579501200025	ENGINEERING, MARINE	194

2022-2023

Research by IAU on Life below water in the Web of Science Database

Title	Link	Keywords
Critical Analysis for Life Cycle Assessment of Bio-Cementitious Materials Production and Sustainable Solutions	DOI 10.3390/su14031920	Marine water
Land Reclamation in a Coastal Metropolis of Saudi Arabia: Environmental Sustainability Implications	DOI 10.3390/w14162546	Marine water
Applications of algae for environmental sustainability:	DOI 10.3389/fmars.2022.1047284	Marine water

Novel bioplastic formulation method from marine green alga		
Serological and Antibiotic Resistance Patterns As Well As Molecular Characterization of <i>Vibrio parahaemolyticus</i> Isolated from Coastal Waters in the Eastern Province of Saudi Arabia	DOI 10.1007/s44197-022-00071-3	Marine water
Microbial biofilms: Recent advances and progress in environmental bioremediation	DOI 10.1016/j.scitotenv.2022.153843	Marine water
Biomonitoring coastal pollution on the Arabian Gulf and the Gulf of Aden using macroalgae: A review	DOI 10.1016/j.marpolbul.2021.113156	Marine water
Metal accumulation capacity of raphidascaridid nematode, <i>Hysterothylacium reliquens</i> , infecting the king soldier bream (<i>Argyrops spinifer</i>)	DOI 10.1016/j.jksus.2023.102635	Fish
Optimal Deep Learning Driven Intrusion Detection in SDN-Enabled IoT Environment	DOI 10.32604/cmc.2023.034176	Fish

