

Ministry of Higher Education and Scientific Research

Republic of Iraq

University: University Of Basrah

College: **SCIENCE**

Department: **ECOLOGY**



Year : 2021-2022

Semester : First

SYLLABUS: < **ADVANCE ENVIRONMENTAL CHEMISTRY** >

INSTRUCTOR: PROF.DR.MAKIA M.AL-HEJUJE

Phone: PHONE NO.

Hours: 2

Office University Of Basrah

Home Page: <http://faculty.uobasrah.edu.iq/faculty/162>

Email: makia.khalaf@uobasrah.edu.iq

COURSE OVERVIEW

In this course, the sources of chemicals in the atmosphere, hydrosphere and soil, images and forms of chemicals in these environments are identified and their interactions, transformations and effects on the organisms and the ultimate fate of those substances in the environment. Also, courses of some important and essential elements of living organisms and the environment.

GOALS AND OBJECTIVES

- Identify the most important chemical pollutants and their sources and interactions in the environment.
- Learn how these materials affect neighborhoods and how they are affected.
- Identify the causes of the spread of chemicals in different environments.
- Knowledge of the impact of different environmental factors on these pollutants.
- Know the environmental role these substances play in different environments and reduce pollution.
- Knowledge of biogeochemical cycles of key elements in the environment

TEXTBOOK AND READINGS

[1] Manahan, Stanley E. "ENVIRONMENTAL SCIENCE, TECHNOLOGY, AND CHEMISTRY" Environmental Chemistry Boca Raton: CRC Press LLC, 2000

[2] https://www.fkit.unizg.hr/_download/repository/0387260617_Environmental_Chemis.pdf

[3]

COURSE ASSESSMENTS

The course grade (**100** points) will be based on the following elements:

	Points
Exams	80
Reading Checks	5
Participation	5
Attendance	10
Assignments	100

COURSE DESCRIPTION AND ASSIGNMENT SCHEDULE

This **NO.** -credit hour course is 15 weeks long. You should invest **NO.** hours every week in this course.

WK	DATE	TOPIC	READING	ASSIGNMENT
1		Defines the Environmental chemistry , applications , Atmospheric regions , Atmospheric compositions , chemistry of Sunlight , Greenhouse Effect and Global Warming		
2		Chemical reactions in the atmosphere , Hydroxyl radicals in the troposphere , The Ozone Layer : Source and Depletion , The Chapman Cycle , Chemistry of Ozone Depletion , photochemical smog , Composition of photochemical smog and London Smog.		
3		Acid Rains , Wet and dry deposition ,The Chemistry of Acid Rains , Nitric oxide (NO) and Sulfur dioxide (SO ₂) reactions , Wet Scrubber System ,How acid rain affects the environment(Trees ,Forests ,fishes, algae ,statues and monuments) , Particles in the Atmosphere , Health Effects of Atmospheric Particulates .		
4		Hydrosphere, Water and the Hydrosphere, Aquatic Life, The chemical Characteristic of bodies of water, Stratification of a lake, Gases in water, carbon dioxide in water and acidity.		
		first examination		Assignment 1
5		Water Acidity , Distribution of species for the CO ₂ -HCO ₃ ⁻ -CO ₃ ²⁻ system in water , Water Alkalinity		
6		Structures and Reactions of Organic Molecules, Microbial Transformation of Organic Substances, biodegradation of organic molecules. Metals in Water, Calcium and other metals in water, Metal ions in aqueous solution , Hydrated metal ions as acids.		
7		Water hardness, Dissolved Carbon Dioxide and Calcium Carbonate Minerals. Complexation and Chelation, organometallic compounds, Selectivity and Specificity in Chelation.		

8		examination		Assignment 2
9		Chemical interactions involving solids , gases and water , Formation of Sediments , Solubility of Solids , Colloidal particles in water , Kinds of Colloidal Particles , zero point of charge (ZPC), Ion absorption and Ion replacement		
10		The Geosphere and Geochemistry , Desertification ,Structure of Minerals , Major Mineral Groups in the Earth's Crust , Environmental Effects of Mining and Mineral Extraction , Nutrients in soil , The Macronutrients and Micronutrients in soil		
11		Pesticides and Chemical Wastes in Soil .		
12		examination		Assignment 3
13		Matter and Cycles of Matter , Endogenic and Exogenic Cycles , Carbon Cycle , Nitrogen Cycle.		
14		Phosphorus Cycle , Sulfur Cycle		
15	Mid Exam			

Is it possible to develop the curriculum <within the teaching authority 20%> to include vocabulary that serves sustainability

1- Yes, it is possible (point an appropriate aspect)	<ul style="list-style-type: none"> -long learning and education - Green chemistry - Sustainable development - Water purification - Environmental development - pollution measurement - Mechanisms for developing the local industry in Iraq Study aspects of developing green areas - Study climatic phenomena in the country- - Mechanisms for obtaining good health and well-being.
2- Suggest aspect that serves sustainability	



مفردات المنهج : < الكيمياء البيئية المتقدم >

رقم الموبايل :	أسم التدريسي : أ.د. مكية مهلهل خلف
عدد وحدات الدرس : 2	جهة الانتساب : جامعة البصرة / كلية العلوم
رابط الصفحة الرسمية :	makia.khalaf@uobasrah.edu.iq الايميل الرسمي :
http://faculty.uobasrah.edu.iq/faculty/162	

نظرة عامة

في هذا المقرر، تحدد مصادر المواد الكيميائية في الغلاف الجوي والغلاف المائي والترربة، وصور وأشكال المواد الكيميائية في هذه البيئات، وتفاعلاتها وتحولاتها وأثارها على الكائنات الحية والمصير النهائي لتلك المواد في البيئة. أيضا دراسة الدورات البايوجيوكيميائية لبعض العناصر الهامة والأساسية للكائنات الحية والبيئة.

الأهداف والغايات

- ✓ تحديد أهم الملوثات الكيميائية ومصادر ها وتفاعلاتها في البيئة.
- ✓ التعرف على كيفية تأثير هذه المواد على الأحياء وكيفية تأثرها.
- ✓ تحديد أسباب انتشار المواد الكيميائية في بيئات مختلفة.
- ✓ معرفة تأثير العوامل البيئية المختلفة على هذه الملوثات.
- ✓ معرفة الدور البيئي الذي تلعبه هذه المواد في البيئات المختلفة والحد من التلوث.
- ✓ معرفة الدورات الكيميائية الحيوية للعناصر الرئيسية في البيئة

المصادر

[1] Manahan, Stanley E. "ENVIRONMENTAL SCIENCE, TECHNOLOGY, AND CHEMISTRY" Environmental Chemistry Boca Raton: CRC Press LLC, 2000

[2] [https://www.fkit.unizg.hr/_download/repository/0387260617_Environmental_Chem is.pdf](https://www.fkit.unizg.hr/_download/repository/0387260617_Environmental_Chem_is.pdf)

[2]

[3]

التقييمات المعتمدة

تعتمد درجة المادة (100) موزعة على الجوانب التالية :

الدرجة	التفاصيل
80	الامتحانات
5	درجة الاستيعاب
5	المشاركة
10	الحضور
100	الدرجة الكلية

وصف الدرس وجدول التخصيص

يتضمن الدرس (3) ساعة - عدد الساعات الأسبوعية معتمدة موزعة على 15 أسبوعًا .

الامتحانات والتقييمات	القراءة في المصدر	الموضوع	التأريخ	الاسبوع
		Defines the Environmental chemistry , applications , Atmospheric regions , Atmospheric compositions , chemistry of Sunlight , Greenhouse Effect and Global Warming		1
		Chemical reactions in the atmosphere , Hydroxyl radicals in the troposphere , The Ozone Layer : Source and Depletion , The Chapman Cycle , Chemistry of Ozone Depletion , photochemical smog , Composition of photochemical smog and London Smog.		2
		Acid Rains , Wet and dry deposition ,The Chemistry of Acid Rains , Nitric oxide (NO) and Sulfur dioxide (SO ₂) reactions , Wet Scrubber System ,How acid rain affects the environment(Trees ,Forests ,fishes, algae ,statues and monuments) , Particles in the Atmosphere , Health Effects of Atmospheric Particulates .		3
		Hydrosphere ,Water and the Hydrosphere , Aquatic Life , The chemical Characteristic of bodies of water , Stratification of a lake, Gases in water , carbon dioxide in water and acidity.		4
الأمتحان 1		first examination		5
		Water Acidity , Distribution of species for the CO ₂ -HCO ₃ -CO ₃ ²⁻ system in water , Water Alkalinity		6
		Structures and Reactions of Organic Molecules, Microbial Transformation of Organic Substances, biodegradation of organic molecules. Metals in Water , Calcium and other metals in water , Metal ions in aqueous solution , Hydrated metal ions as acids.		7
		Water hardness , Dissolved Carbon Dioxide and Calcium Carbonate Minerals .Complexation and Chelation , organometallic compounds , Selectivity and Specificity in Chelation .		8
الامتحان 2		examination		9
		Chemical interactions involving solids , gases and water , Formation of Sediments , Solubility of Solids , Colloidal particles in water , Kinds of Colloidal Particles , zero point of charge (ZPC), Ion absorption and Ion replacement		10
		The Geosphere and Geochemistry , Desertification ,Structure of Minerals , Major Mineral Groups in the Earth's Crust ,		11

		Environmental Effects of Mining and Mineral Extraction , Nutrients in soil , The Macronutrients and Micronutrients in soil	
		Pesticides and Chemical Wastes in Soil .	12
الامتحان 3		examination	13
		Matter and Cycles of Matter , Endogenic and Exogenic Cycles , Carbon Cycle , Nitrogen Cycle.	14
		Phosphorus Cycle , Sulfur Cycle	15
امتحان نهاية الفصل			

هل يمكن تطوير المنهج < ضمن صلاحية التدريسي 20% > على ان تتضمن مفردات تخدم الاستدامة	
<p>1- نعم يمكن ضمن المحاور</p> <ul style="list-style-type: none"> - تطوير التعلم والتعليم مدى الحياة- - الكيمياء الخضراء- - التنمية المستدامة- - تنقية المياه- تطوير البيئة- - قياس التلوث - - كفاءة البيئة الجامعة - اليات تطوير الصناعة المحلية في العراق دراسة ظواهر المناخية في البلد 	
	<p>2- أقترح موضوع يخدم الاستدامة</p>