

COURSE SPECIFICATIONS

Form

Course Title: **Environmental Chemistry**

Course Code: **4026846-3**



Date: 28-10-2018

Institution: Umm Al-Qura University.

College: Faculty of Applied Science

Department: Department of Chemistry

A. Course Identification and General Information

1. Course title and code: **Environmental Chemistry / 4026846-3**

2. Credit hours: **3 hrs. (Theoretical)**

3. Program(s) in which the course is offered. **M. Sc. in Chemistry**

(If general elective available in many programs indicate this rather than list programs)

4. Name of faculty member responsible for the course: **Prof. Amr Lotfy Saber**

5. Level/year at which this course is offered: **3rd / 2nd**

6. Pre-requisites for this course (if any): **not applicable**

7. Co-requisites for this course (if any): **not applicable**

8. Location if not on main campus: **El-Abedyah, El-Azizya, and El-Zaher**

9. Mode of Instruction (mark all that apply):

- | | | | |
|-------------------------------------|-------------------------------------|-------------|---------------------------------------|
| a. Traditional classroom | <input type="checkbox"/> | percentage? | <input type="checkbox"/> |
| b. Blended (traditional and online) | <input checked="" type="checkbox"/> | percentage? | <input type="checkbox" value="100%"/> |
| c. E-learning | <input type="checkbox"/> | percentage? | <input type="checkbox"/> |
| d. Correspondence | <input type="checkbox"/> | percentage? | <input type="checkbox"/> |
| f. Other | <input type="checkbox"/> | percentage? | <input type="checkbox"/> |

Comments:

B Objectives

1. The main objective of this course

By completing this course, the students will be able to:

- Know the air, water and soil pollution and their monitoring.
- Describe the chemical composition of atmosphere, chemical and photochemical reaction in atmosphere.
- Classify various air pollutants and their chemistry and analytical methods for the analysis of various air pollutants.
- Use analytical methods for the determination different pollutants such as fertilizers, pesticides, plastics and heavy metals.
- Compare between analytical methods for estimation of various water pollutants, purification and treatment of water.

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

- Increased use of IT or web based reference material.
- The use of smart teaching halls for lectures.
- Changes in content as a result of new research in the field.
- Encourage students to carry out research reports related to the course subjects using the library, data base services, and/or websites.

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:

1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
Introduction of atmosphere, chemical composition of atmosphere, chemical and photochemical reaction in atmosphere	1	3
Smog formation, oxides of N, S, C, O and their effect, acid rain, pollution by chemicals, minerals etc., ozone destruction by halogenated species, other various air pollutants and their chemistry	2	6
Analytical methods for the analysis of various air pollutants	2	6



Introduction to hydrological cycle, chemical composition of water bodies like lake, rivers, stream etc. Water chemistry and weathering regimes (Alkalinity, dissolved inorganic carbon and pH buffering).	1	3
Role of various water pollutants (for example: Aluminium solubility and acidity, heavy metal contamination, iron as a nutrient in the oceans) in water pollution	1	3
Analytical methods for estimation of various water pollutants, purification and treatment of water	2	6
Formation of soils (soil sampling, soil texture, composition of soil, macro and micro nutrients, soil pH)	1	3
Pollution based on fertilizers, pesticides, plastic, heavy metals, and organic contaminants in soils	1	3
Analytical methods for the determination of each pollutant in different soil samples.	1	3
Revision	1	3

2. Course components (total contact and credit hours per semester):

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	39	--	--	--	--	39
	Actual	39	--	--	--	--	39
Credit	Planned	3	--	--	--	--	3
	Actual	3	--	--	--	--	3

3. Individual study/learning hours expected for students per week.

3 hrs

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies

On the table below are the five NQF Learning Domains, numbered in the left column.

First, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). **Second**, insert supporting teaching strategies that fit and align with the assessment methods and targeted learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

Curriculum Map

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	Knowledge		
1.1	Recognize air, water, soil pollution and monitoring.	<ul style="list-style-type: none"> • Lectures • Scientific discussion • Library visits • Web-based study • Using open discussion to link the previous knowledge to the current and future topics • The students use the internet to prepare an essay about a recent advances related to the course 	<ul style="list-style-type: none"> • Exams • web-based student performance systems • portfolios • long and short essays
1.2	Identify chemical composition of atmosphere, chemical and photochemical reaction in atmosphere.		
1.3	Define smog formation, oxides of N, S, C, O and their effect.		
1.4	Discuss the various air pollutants and their chemistry and analytical methods for the analysis of various air pollutants.		
1.5	Know the hydrological cycle, chemical composition of water bodies like lake, rivers, stream.		
1.6	Recognize the role of various water pollutants in water quality, analytical methods for estimation of various water pollutants, purification and treatment of water.		
1.7	Outline the composition of soil, macro and micro nutrients, pollution based on fertilizers, pesticides, plastics and heavy metals, analytical methods for the determination of each pollutant.		
2.0	Cognitive Skills		
2.1	Design the suitable procedures to identify the chemical composition air pollutants	<ul style="list-style-type: none"> • Lectures • Scientific discussion • Library visits • Web-based study • Using brain storming at the beginning of each lecture in order to stimulate the students towards the new topic of the course. • Enhancing open discussion during the lecture. 	<ul style="list-style-type: none"> • Exams • web-based student performance systems • portfolios • long and short essays • Through assignments and homework.
2.2	Apply the suitable analytical methods to analysis the different air samples.		
2.3	Formulate the different types of pollutants		
2.4	Confirm the suitable methods to detect the pollutants in water and soil samples		
2.5	Design the suitable procedures to identify the chemical composition air pollutants		

3.0	Interpersonal Skills & Responsibility		
3.1	Take the personality and responsibility for their own learning.	<ul style="list-style-type: none"> • Encourage the solving problems in groups during lecture. • Making open discussion about certain recent topic of the course. 	Homework and group reports
3.2	Work effectively in groups and exercise leadership when appropriate.		
3.3	Act ethically and consistently with high molar standards in personal and public forums.		
3.4	Community linked thinking		
4.0	Communication, Information Technology, Numerical		
4.1	Communicate effectively in oral and written forms.	<ul style="list-style-type: none"> • Lectures • Scientific discussion • Library visits • Web-based study 	<ul style="list-style-type: none"> • Exams • web-based student performance systems • portfolios • long and short essays
4.2	Use information and communication technologies		
4.3	Use basic mathematical and statistical techniques.		
5.0	Psychomotor(if any)		
5.1	NOT APPLICABLE		
5.2			

5. Assessment Task Schedule for Students During the Semester

	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Activities and Assignments.	--	10 %
2	Midterm Exam.	8	30 %
3	Final Exam.	15-16	60 %
4	Total	100%	

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

- We have faculty members to provide counselling and advice.
- Office hours: During the working hours weekly.
- Academic advising for students.

E Learning Resources

1. List Required Textbooks

- 1- J.E. Andrews, P. Brimblecombe, T.D. Jickells, P.S. Liss and B. Reid "An Introduction to Environmental Chemistry" 2nd edition Copyright © © 2004 by Blackwell Science Ltd a Blackwell Publishing company.
- 2- Eric Lichtfouse, Jan Schwarzbauer, Didier Robert "Environmental Chemistry (Green Chemistry and Pollutants in Ecosystems), Copyright © Springer-Verlag Berlin Heidelberg 2005, Printed in Germany.

2. List Essential References Materials (Journals, Reports, etc.)

- Lecture Handouts available on the coordinator website.

3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.

- <http://www.chemweb.com>
- <http://www.sciencedirect.com>
- <http://www.rsc.org>

4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.
- None.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.)

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)

- Equipped classrooms.

2. **Technology** resources (AV, data show, Smart Board, software, etc.)

- Room equipped with computer and projector and TV.

3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

- No other requirements.

G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching

- Complete the questionnaire evaluation of the course in particular

2. Other Strategies for Evaluation of Teaching by the Instructor or the Department

- Observations and the assistance of colleagues.

- Independent evaluation forextenttoachieve students the standards.
- Independent adviceofthe dutiesandtasks.

3. Procedures for Teaching Development

- Workshops for teaching methods.
- Continuous training of member staff.
- The application of e-learning.
- Exchange of experiences internal and external.

4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution)

- Check marking of a sample of exam papers, or student work.
- Exchange corrected sample of assignments or exam basis with another staff member for the same course in other faculty.

5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it.

- Periodic review of the contents of the syllabus and modify the negatives.
- Hosting a visiting staff to evaluate of the course.
- Workshops for teachers of the course.

Name of Course Instructor: Prof. Amr Lotfy Saber _____

Signature:



Date Completed: 28/10/2018

Program Coordinator: Dr. Ismail Ibrahim Althagafi

Signature:



Date Received: **29/10/2018**

