



ATTACHMENT 2 (e)

Course Specifications

Kingdom of Saudi Arabia

The National Commission for Academic Accreditation & Assessment

Chemistry of Energy Resources

4024585-2





Course Specifications

Institution	Umm Al-Qura University	Date of Report: 2017
College/Department	Applied Science /Chemistry Department	

A. Course Identification and General Information

1. Course title and code: Chemistry of Energy Resources/4024585-2			
2. Credit hours: 2 h (theoretical)			
3. Program(s) in which the course is offered. (If general elective available in many programs indicate this rather than list programs) Chemistry			
4. Name of faculty member responsible for the course: Prof. Mohamed Ismail Mohamed Awad			
5. Level/year at which this course is offered 8th Level-Fourth year			
6. Pre-requisites for this course (if any) Electrochemistry- 4022143-3			
7. Co-requisites for this course (if any)			
8. Location if not on main campus: both on El-Abedyah and El-Zaher			
9. Mode of Instruction (mark all that apply)			
a. Traditional classroom	<input checked="" type="checkbox"/>	What percentage?	<input type="text" value="100 %"/>
b. Blended (traditional and online)	<input type="checkbox"/>	What percentage?	<input type="text"/>
c. e-learning	<input type="checkbox"/>	What percentage?	<input type="text"/>
d. Correspondence	<input type="checkbox"/>	What percentage?	<input type="text"/>
f. Other	<input type="checkbox"/>	What percentage?	<input type="text"/>
Comments:			



B Objectives

<p>What is the main purpose for this course?</p> <ul style="list-style-type: none"> • Students know renewable energy resources as alternative sources for finite sources. • To understand and analyze the present and future energy demand of world and nation regarding the available renewable energy resources such as, solar and nuclear energy. • Students familiar with Nuclear chemistry including terminology, Radioactivity and the nature of atoms, Radioactive Decay modes, Radioactive Decay Kinetics and nuclear reactions. • Brief introduction on fundamentals of solar energy and photovoltaic cells • Brief introduction to fuel cells.
<p>2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field)</p> <ul style="list-style-type: none"> • Using information technology and the Internet to prepare detailed research of everything new in the course. • Add lectures to review all new applications in the area of specialization through use of explanatory films and presentations (Video Projector), (power point) • Workshops and scientific forums regularly for more information and training.

C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be attached)

1. Topics to be Covered		
List of Topics	No. of Weeks	Contact Hours
<ul style="list-style-type: none"> • The main sources of energy • Problems associated with the use of conventional energy sources, including fossil fuels, chemistry of fossil foils, with regard to future supply and the environment. 	1	2
<ul style="list-style-type: none"> - Nuclear energy: <ul style="list-style-type: none"> ○ -The atomic nuclei, atomic structure and composition of nuclei. - Nuclear masses and stability of nucleus. 	2	4





- Radioactive decay processes, alpha, beta and gamma decays.	1	2
- Radioactive decay and growth. - Equations of transformation during nuclear reactions	1	2
First exam	1	2
- Fission, charge and mass distribution. - Radioactive decay, Half-life, First order reaction, Source strength – Alpha, beta, gamma-radiation, x-rays, high-energy particles – Accelerators, Synchrotron	1	2
Solar energy - An overview including principles of photovoltaics, dye sensitized solar cells and photoelectrochemical cells.	1	2
- Solar cells as cost effective alternative - Impact on environment	1	2
Second exam	1	2
Fuel cells: - The working principles of a Fuel Cell.	1	2
- Fuel cells types	1	2
- Polymer Electrolyte Fuel Cell and Direct Methanol Fuel Cells as examples	1	2
Final exam	1	2





2. Course components (total contact hours and credits per semester):						
	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	28					28
Credit	2					2

3. Additional private study/learning hours expected for students per week. 2hr
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4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy
<ul style="list-style-type: none"> • A brief summary of the knowledge or skill the course is intended to develop; • A description of the teaching strategies to be used in the course to develop that knowledge or skill; • The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned.

	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	Knowledge		
1.1	To know types of radiation emitted by radioactive isotopes.	<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 posters lab manuals
1.2	To know the relation between the stability of nucleus from the ratio of neutrons to protons		
1.3	To define binding energy		
1.4	To know about the energy accompany nuclear reactions		
1.5	To mention types of nuclear reactions		
1.6	To know instruments for measuring radiation		
1.7	To mention some applications of radioactive isotopes in medicine, agriculture ...etc.		
1.8	To write about types of solar cells		
1.9	To mention types of fuel cells		
2.0	Cognitive Skills		
2.1	To predict the stability of radioactive isotope	<ul style="list-style-type: none"> • Lectures • Scientific discussion • Library visits 	<ul style="list-style-type: none"> • web-based student performance systems • portfolios
2.2	To compare types of nuclear reaction		



2.3	To compare the types of radioactive emissions	• Web-based study	• posters demonstrations
2.4	To differentiate between solar cells		
2.5	To compare Fuel cells		
3.0	Interpersonal Skills & Responsibility		
3.1	The ability for teamwork and the distribution of tasks.	- Scientific discussion -	- web-based student performance systems
3.2			
4.0	Communication, Information Technology, Numerical		
4.1	- The ability to debate and dialogue with clear scientific method.	- Lectures - Scientific discussion - Library visits - Web-based study	- web-based student performance systems - individual and group presentations
4.2	The ability to present or explain scientific topic.		
5.0	Psychomotor NOT APPLICABLE		
5.1			
5.2			

5. Schedule of Assessment Tasks for Students During the Semester

	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Homework or activities.	--	10 %
2	First Periodic Exam.	6	20 %
3	Second Periodic Exam.	12	20 %
4	Final Exam.(2 hours exam)	16	50 %
5	Total		100 %

D. Student Academic Counseling and Support

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

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



E. Learning Resources

1. List Required Textbooks
<ul style="list-style-type: none">• Textbook of Nuclear Chemistry, A. Singh, R. Singh, Campus Publishers, 2006• Applied Photovoltaics, Stuart Wenham, Martin Green, and Muriel Watt, Earthscan, 2007, ISBN 1- 84407-407-3• Fuel cells: problems and solutions, Vladimir S. Bagotsky, Second Edition, John Wiley & Sons, 2012.
2. List Essential References Materials (Journals, Reports, etc.)
3. List Recommended Textbooks and Reference Material (Journals, Reports, etc)
4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.)
<ul style="list-style-type: none">• http://www.chemweb.com• http://www.sciencedirect.com
5. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

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.)
<ul style="list-style-type: none">• Classrooms capacity (30) students.• Providing hall of teaching aids including computers and projector.
2. Computing resources (AV, data show, Smart Board, software, etc.)
<ul style="list-style-type: none">▪ Room equipped with computer and projector.
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)
<ul style="list-style-type: none">• No other requirements.

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching Complete the questionnaire evaluation of the course in particular.
2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor
<ul style="list-style-type: none">• Observations and the assistance of colleagues.• Independent evaluation for extent to achieve students the standards.• Independent advice of the duties and tasks.
3 Processes for Improvement of Teaching
<ul style="list-style-type: none">▪ Workshops for teaching methods.



- **Continuous training of member staff.**
- **Review of strategies proposed.**
- **Providing new tools for learning.**
- **The application of e-learning.**
- **Exchange of experiences internal and external.**

4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff 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 improvement.

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

Faculty or Teaching Staff: Professor Mohamed Awad

Signature:  Date Report Completed: 12/1/2019

Received by: Dr Ismail I. Althagafi Department Head

Signature:  Date: 20/1/2019

