

COURSE SPECIFICATIONS Form

Course Title: Nanomaterials and Hybrid Materials

Course Code: 4026849-3



Date: 14-2-2019

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: **Nanomaterials and Hybrid Materials / 402849-3**

2. Credit hours: **3 (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. Abd El Rahman Khedr**

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

6. Pre-requisites for this course (if any): **None**

7. Co-requisites for this course (if any): **None**

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

Make the students acquainted to the basic concept of nano and hybride materials and changes of chemical and physical properties due size reduction, and the terminology related to science, nanomaterials and nanotechnology. The students will study the methods of preparation, the most recent tools of nanomaterials characterization, the applications and fictionalization of nanomaterialsand hybride materials

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)

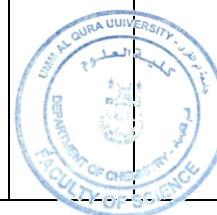
The students will be mentioned to prepare an essay or a report from literature using the library, data base services, and/or websites to follow up and update the new topics of the subject of the course.

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
<ul style="list-style-type: none"> General introduction and history of nanotechnology. Importance of the nanoparticles in industries and in our lives. 	1	3
<ul style="list-style-type: none"> Approaches in nanotechnology and typical syntheses of nanoparticles. Properties of nanomaterials, chemical and physical property. Reasons for changing the properties. 	3	9
<ul style="list-style-type: none"> Methods of preparation of other nano-formulations such as mesoporous, MOF,..... materials and their properties 	2	6
<ul style="list-style-type: none"> Spectroscopic and microscopic tools used in nanomaterials characterizations General industrial applications for nanoscale systems and fixtures, nano-optic applications, bio-nanotechnology applications and medical nanotechnology applications Nanotechnology and clean technologies: What is a clean technology challenges facing us in the areas of energy, water and environment, exploring the contribution of nanotechnology to solve these problems, the current obstacles faced by nanotechnology. 	2	6



<ul style="list-style-type: none"> Hybrid materials in nature Development of hybrid materials Classification Distinction between nanocomposites and hybrid materials Advantages of hybrid materials over traditional composites Hybrid Composite Materials Inorganic/Organic Hybrids Hybridization of Functions New Classification of Hybrid Materials 	3	9
<ul style="list-style-type: none"> Synthesis Building block approach In situ formation of the components In situ formation of inorganic materials Formation of organic polymers in presence of preformed inorganic materials Hybrid materials by simultaneous formation of both components 	2	6
<ul style="list-style-type: none"> Applications 	1	3

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

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	39	3	---	---	---	42
	Actual	39	3	---	---	---	42
Credit	Planned	3	---	---	---	---	3
	Actual	3	---	---	---	---	3

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

2

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 the methods of nanoparticles and	<ul style="list-style-type: none"> Lectures 	<ul style="list-style-type: none"> Exams

	hybride materialspreparation	<ul style="list-style-type: none"> Scientific discussion Library visits Web-based study 	<ul style="list-style-type: none"> web-based student performance systems
1.2	Name the some applications of nanomaterials and hybride materialsin industry	<ul style="list-style-type: none"> Scientific discussion Library visits Web-based study 	<ul style="list-style-type: none"> web-based student performance systems
2.0	Cognitive Skills		
2.1	Compare between properties of nanomaterialsand hybride materials	<ul style="list-style-type: none"> Scientific discussion Library visits Web-based study 	<ul style="list-style-type: none"> web-based student performance systems
2.2	Compare between methods of characterization of nanomaterialsand hybride materials	<ul style="list-style-type: none"> Scientific discussion Library visits Web-based study 	<ul style="list-style-type: none"> web-based student performance systems <p style="text-align: right;">exams</p>
3.0	Interpersonal Skills & Responsibility		
3.1	Ability to communicate results of work to classmates.	<ul style="list-style-type: none"> Scientific discussion Library visits Web-based study 	<ul style="list-style-type: none"> web-based student performance systems
3.2	Ability to work in a team to perform a specific task.	<ul style="list-style-type: none"> Scientific discussion Library visits Web-based study 	<ul style="list-style-type: none"> individual and group presentations
4.0	Communication, Information Technology, Numerical		
4.1	Interpret the results of characterization tools	<ul style="list-style-type: none"> Scientific discussion Library visits 	<ul style="list-style-type: none"> web-based student performance systems
4.2	Encourage students to use internet for searching certain electronic journals regarding topics of the course.	<ul style="list-style-type: none"> Scientific discussion Library visits 	<ul style="list-style-type: none"> web-based student performance systems individual and group presentations
4.3	Scientific writing.		<ul style="list-style-type: none"> individual and group presentations
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	Assignments and activities.	--	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)
 - Presence of faculty members to provide consulting and advice.
 - Office hours: during the working hours weekly, and the creation of appropriate means.

E Learning Resources

1. List Required Textbooks

1. Nanochemistry. G.B. Sergeev, K.J. Klabunde, Elsevier, **2013**, ISBN: 978-0-444-59397-9
2. Introduction to Nanoscience and Nanotechnology, Gabor L. Hornyak, H.F. Tibbals, Joydeep Dutta, John J. Moore, CRC Press. Copyright, **2009**.
3. Nanomaterials and Nanochemistry, C. Bréchnignac, P. Houdy, M. Lahmani, Springer Science & Business Media. Copyright, **2006**.
4. "Nanochemistry, A Chemical Approach to Nanomaterials", G. Ozin and A. Arsenault, RSC (Royal Society of Chemistry), **2005**.
5. "Nanostructures and Nanomaterials", G. Cao, Imperial College Press, **2004**
6. Nanotechnology: Nanomaterials and Nanodevices, G. Mohan Kumar, Alpha Science International Ltd. **2015**
7. Synthesis and Tribological Applications of Hybrid Materials, Mohammad Jawaid (Editor), Rajini Nagarajan (Editor), Jacob Sukumaran (Editor), Patrick De Baets (Editor) ISBN: 978-3-527-80859-5 August **2018** 248 Pages
8. Handbook of Organic-Inorganic Hybrid Materials and Nanocomposites, Hari Singh Nalwa (Author), American Scientific Publishers (March 24, **2013**), ISBN-10: 158883011X, ISBN-13: 978-1588830111

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

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

1. Nanochemistry. G.B. Sergeev, K.J. Klabunde, Elsevier, **2013**, ISBN: 978-0-444-59397-9
2. Introduction to Nanoscience and Nanotechnology, Gabor L. Hornyak, H.F. Tibbals, Joydeep Dutta, John J. Moore, CRC Press. Copyright, **2009**.
3. Nanomaterials and Nanochemistry, C. Bréchnignac, P. Houdy, M. Lahmani, Springer Science & Business Media. Copyright, **2006**.
4. "Nanochemistry, A Chemical Approach to Nanomaterials", G. Ozin and A. Arsenault, RSC (Royal Society of Chemistry), **2005**.
5. "Nanostructures and Nanomaterials", G. Cao, Imperial College Press, **2004**
6. Nanotechnology: Nanomaterials and Nanodevices, G. Mohan Kumar, Alpha Science International Ltd. **2015**

4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

-<http://en.wikipedia.org/wiki/Petroleum1>

-<http://www.chemhelper.com/>

- <http://www.chemweb.com/>

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.)
-classroom capacity (30) students. |
| 2. Technology resources (AV, data show, Smart Board, software, etc.)
No other requirements |
| 3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) |

G Course Evaluation and Improvement Procedures


- | |
|---|
| 1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching
Scheduled to complete the questionnaire calendar in particular.
- Focus group discussions with small groups of students. |
| 2. Other Strategies for Evaluation of Teaching by the Instructor or the Department
Feedback and assistance from colleagues.
- Independent evaluation of the extent to which students of the standards.
- independent advice to the duties and tasks |
| 3. Procedures for Teaching Development
- Workshops for the teaching methods.
- Continuous training for the faculty member.
- Revision of the proposed strategies.
- Application of the means of e-learning.
- Exchange of internal and external experiences |
| 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)
Checking the samples of test papers, or student work, which has been corrected by a faculty member.
- Exchange professors from different educational institutions on regular basis to correct samples of test papers |
| 5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it.
Consult with other professors teaches the same subject.
- Hosting a visiting professor to evaluate the subject. |

- Workshops for teachers whom teach the same subject.
- Periodic review for teachers to modify the negatives contents in the subject.

Name of Course Instructor: Prof. Abd El Rahman Khedr

Signature:  Date Completed: **14/2/2019**

Program Coordinator: Dr. Ismail Ibrahim Althagafi

Signature:  Date Received: **14/2/2019**

