

ATTACHMENT 5.

Kingdom of Saudi Arabia
**The National Commission for Academic Accreditation &
Assessment**

T6. Course Specifications
(CS)

Advanced Inorganic Chemistry

(402721-2)



Course Specifications

Institution: Umm Al-qura University	Date: 2017
College/Department: Faculty of Applied Sciences / Department of Chemistry	

A. Course Identification and General Information

1. Course title and code: Advanced Inorganic Chemistry / 402721-2			
2. Credit hours: 2 (theoretical)			
3. Program(s) in which the course is offered.: Ph. D. in Chemistry (If general elective available in many programs indicate this rather than list programs)			
4. Name of faculty member responsible for the course: Dr. Hoda Abou El-Fetouh El-Ghamry			
5. Level/year at which this course is offered: 1st / 1st			
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"/>	What percentage?	<input type="checkbox"/>
b. blended (traditional and online)	<input checked="" type="checkbox"/>	What percentage?	<input type="text" value="100"/>
c. e-learning	<input type="checkbox"/>	What percentage?	<input type="checkbox"/>
d. correspondence	<input type="checkbox"/>	What percentage?	<input type="checkbox"/>
f. other	<input type="checkbox"/>	What percentage?	<input type="checkbox"/>
Comments:			

B Objectives

- Summary of the main learning outcomes for students enrolled in the course.
 - Prepare the student to become intimately acquainted with some advanced aspects related to nanomaterials, nanotechnology, carbon nanotubes and inorganic fibers.
 - The students will be familiar with the advanced routes of synthesis of coordination and organometallic compounds.
 - Special emphasis will be on polyoxometalates and their applications in heterogeneous and homogeneous catalysis.
- 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)
 - Link the theoretical and practical sides of the course.
 - The use of teaching intelligent classes for lectures.
 - Variation of learning sources for the course, so that students benefit from more than one reference.
 - Encourage students to prepare reports in different subjects of the course.

C. Course Description (Note: General description in the form used in Bulletin or handbook)

Course Description:

1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
• Metal-metal single and multiple bonds.	1	2
• Transition metal hybrids. Electron deficient compounds.	1	2
• The chemistry of lanthanides and actinides.	1	2
• Advanced techniques for synthesis of coordination and organometallic compounds.	1	2



• An introduction to polyoxometalate chemistry.	1	2
• Physical methods in studying polyoxometalates: extended huckel molecular orbital calculations and spectroscopic properties.	1	2
• Applications of polyoxometalates in homogeneous catalysis.	1	2
• Heterogeneous catalysis by hetero-poly compounds.	1	2
• Complex oxides as molecular materials: structure and bonding in high-valent early transition metal compounds.	1	2
• An introduction to nanochemistry and its application in inorganic chemistry.	1	2
• Carbon nanotubes, structures and applications	2	4
• Inorganic fibers.	1	2



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

	Lecture	Tutorial	Laboratory or Studio	Practical	Other:	Total
Contact Hours	26	-		-		26
Credit	2	-		-		2

3. Additional private 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 Strategy

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 intended learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy ought to reasonably fit and flow together as an integrated learning and teaching process. (Courses are not required to include learning outcomes from

each domain.)			
Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	Knowledge		
1.1	Explain the Metal-metal single and multiple bonds and transition metal hybrids.	<ul style="list-style-type: none"> • Lectures • Scientific discussion • Library visits • Web-based study 	<ul style="list-style-type: none"> • Written mid-term and final exams. • Long and short essays. • web-based student performance systems
1.2	State the advanced techniques for synthesis of coordination and organometallic compounds		
1.3	Memorize the physical methods in studying polyoxometalates		
1.4	Describe the carbon nanotubes, structures and applications		
1.5	Describe the Inorganic fibers.		
2.0	Cognitive Skills		
2.1	Report the physical methods in studying polyoxometalates	<ul style="list-style-type: none"> • Lectures • Scientific discussion • Library visits • Web-based study 	<ul style="list-style-type: none"> • Mid-term and final exams. • Measuring the response to the assignments.
2.2	Interpret the applications of polyoxometalates in homogeneous catalysis.		
2.3	Discover the heterogeneous catalysis by hetero-poly compounds		
2.4	Interpret carbon nanotubes, structures and applications.		
2.5	Interpret the inorganic fibers.		
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. 	<ul style="list-style-type: none"> • Homeworks • Group reports.
3.2	Working 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"> • The use of computers in the training room of the department. • Organizing group visits to the Central Library. • The use of the international information network (internet). 	<ul style="list-style-type: none"> • Ask questions that test the student's ability to interpret simple statistical information. • Assess the duties associated with the proper use of communication skills and numerical process
4.2	Use information and communication technologies		
4.3	Use basic mathematical and statistical techniques		
5.0	Psychomotor		
5.1	Not applicable.		
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	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 advice. (include amount of time teaching staff are expected to be available each week)
- Office hours: During the working hours weekly.
 - Academic advising for students.
 - Availability of Staff members to provide counselling and advice.

E. Learning Resources

1. List Required Textbooks
- J.J. Borrás-Almenar, E. Coronado, A. Müller, M. Pope; "Polyoxometalate Molecular Science" Springer, 1st ed. 2003.
2. List Essential References Materials (Journals, Reports, etc.)
- journal of nanoscience and nanotechnology
 - Journal of Cluster Science.
3. List Recommended Textbooks and Reference Material (Journals, Reports, etc)
- K.J. Klabunde and G.P. Sergeev " Nanochemistry" Elsevier, 2 nd ed.; 2013.
4. List Electronic Materials, Web Sites, Facebook, Twitter, etc.
- <http://www.springer.com/us/book/9781402012419>
 - <https://www.elsevier.com/books/nanochemistry/klabunde/978-0-444-59397-9>
5. 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 lecture hall and laboratory equipped specializing in inorganic chemistry.
2. Computing resources (AV, data show, Smart Board, software, etc.)
 - Room equipped with computers, data show 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 Processes

1. Strategies for Obtaining Student Feedback on Effectiveness of Teaching
 - Structured group discussions and/or focus groups.
 - Questionnaires can be used to collect student feedback.
 - Student representation on staff-student committees and institutional bodies.
2. Other Strategies for Evaluation of Teaching by the Instructor or by the Department
 - The instructor's statement of his/her goals for the course, teaching methods and philosophy, student outcomes, and plans for improvement are a critical source of information.
 - A systematic self-review has the potential for contributing significantly to the instructor's teaching improvement by focusing on the strengths and weaknesses of the course in light of his/her original course objectives.
 - Visits by other faculty can provide information about the process of teaching.
 - Colleagues have the expertise to evaluate the quality of a course as evidenced by its content and format (peer reviewers).
3. Processes for Improvement of Teaching
 - Providing new tools for learning.
 - The application of e-learning.
 - Exchange of experiences internal and external.
 - Training programs and workshops for Staff member.
 - Review of strategies proposed.

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 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.

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

- Workshops for teachers of the course.
- 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.

Name of Instructor: **Dr. Hoda Abou El-Fetouh El-Ghamry**

Signature: _____

Date Report Completed: **18/1/2017**

Name of Field Experience Teaching Staff:

Program Coordinator: _____

Signature: _____

Date Received: _____

