

ATTACHMENT 5.

Kingdom of Saudi Arabia

The National Commission for Academic Accreditation &
Assessment

T6. Course Specifications

(CS)

Mechanism of Inorganic Reactions

(402623-3)



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: Mechanism of Inorganic Reactions / 402623-3	
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. Dr. Nashwa El-Metwaly	
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"/> What percentage? <input type="checkbox"/>
b. blended (traditional and online)	<input checked="" type="checkbox"/> What percentage? <input type="text" value="70%"/>
c. e-learning	<input checked="" type="checkbox"/> What percentage? <input type="text" value="20%"/>
d. correspondence	<input type="checkbox"/> What percentage? <input type="checkbox"/>
f. other	<input checked="" type="checkbox"/> What percentage? <input type="text" value="10%"/>
Comments:	

B Objectives

1. What is the main purpose for this course?

The aim is to teach students basic mechanisms for inorganic reaction types, such as: electron transfer reactions, ligand substitution reactions and migration & insertion reactions, outer -Inner shell mechanism, conditions of mechanism reactions. Students must know how to use inorganic reaction mechanisms available in the literature to solve chemical problems.

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)

- Problem solving skills, relating to qualitative and quantitative information
- E-Learning system is being introduced.
- Students can download course material which can be helpful for learning.
- Interpersonal skills, relating to the ability to interact with other people and to engage in team-working through group discussion.

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
Types of reactions, complexes formation constants and kinetics of reactions	2	6
Substitution reactions in square planer	1	3
Factors affecting on rate of water exchange reactions	1	3
Substitution reactions in octahedral. Trans effect in substitution reaction	2	6
Possible mechanisms of ligand exchange reactions. Charge transfer reactions.	2	6
Migration and insertion reactions, outer -Inner shell mechanism, conditions of mechanism	2	6

Reactions of coordinated ligands. Photochemical reactions of complex.	2	6
Catalyzed substitution reactions, addition of protons to metals.	1	3

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

	Lecture	Tutorial	Laboratory or Studio	Practical	Other:	Total
Contact Hours	39	4	0	0	0	43
Credit	3	0	0	0	0	3

3. Additional private study/learning hours expected for students per week.

3

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	Know types of reactions, complexes formation constants and kinetics of reactions	Class room lectures - Assignments - Individual handwritten assignments require	- Written tests - Evaluate effective participation of students during lecture presentation
1.2	Describe the substitution reactions in square planer	use of library reference	- Home work duties
1.3	Know factors affecting on rate of water		

	exchange reactions	material and web sites to identify information required to complete tasks. - E-learning through university website	assigned in e-learning site.
1.4	Recognize the substitution reactions in octahedral and trans effect in substitution reaction.		
1.5	Explain possible mechanisms of ligand exchange reactions and charge transfer reactions		
1.6	Distinguish migration and insertion reactions, outer -inner shell mechanism, conditions of mechanism.		
1.7	Memorize photochemical reactions of complexes		
1.8	Know catalyzed substitution reactions, addition of protons to metals		
2.0	Cognitive Skills		
2.1	Compare between reactions types, complexes formation constants and kinetics of reactions	-Making connections between different concepts across the domains. - Assigning research questions that can be answered through collecting and analyzing data. - Summarizing the findings of online research - Using the instructor's webpage learning activities	Solving general chemistry problems related to qualitative and quantitative information at the end of each topic. - Individual assignments or oral exam for developing/solving a task
2.2	Discover factors affecting on rate of water exchange reactions		
	Apply substitution reactions in octahedral and trans effect in substitution reaction		
	Interpret migration and insertion reactions, outer -inner shell mechanism, conditions of mechanism		
3.0	Interpersonal Skills & Responsibility		
3.1	Exceed ethics for communication with each others	Using Power Point (it's easy to cover more material quickly).	Assessment of group assignment includes component
3.2	Encourage students to use online resources		

3.3	Motivate them to use Internet for collecting statistical data	- Group discussion - Online workshops	for individual contribution. - Providing feedback. - Encouraging self-assessment during the learning process
3.4	Guide students to deal with Microsoft Office (e.g. Excel, Microsoft Access, front page) to analyze data and prepare statistical reports		
4.0	Communication, Information Technology, Numerical		
4.1	Able to communicate with his colleagues across all available tools	- Debates learning - Group working. - Mini seminars prepared by the students to present their team projects.	- Instructor's feedback during study - Final and midterms exams include different problems need numerical and technical skills
4.2	Enrich the knowledge in information technology that will enable them to gather, interpret, and communicate information and ideas		
4.3	Must have sufficient information about how to thinking to solve problems that will enable them to apply in interpreting and proposing solutions		
4.4	Communicate via the available electronic tools		
4.5	Use of search engines across the Web		
5.0	Psychomotor		
5.1	Not applicable		

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: 3 hours

Total 3 hrs. of office hours for individual student consultations and academic advice per week in e-learning as mentioned before.

E Learning Resources

1. List Required Textbooks

- **Jim D. Atwood , Inorganic and Organometallic Reaction Mechanisms 2nd Edition**

- **B .P Lever , Inorganic Electronic Spectroscopy , Longman , 1992**

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

- **Reaction mechanisms of inorganic and organometallic systems"**, New York: Oxford University Press, 2007 ISBN 9780195301007

3. List Recommended Textbooks and Reference Material (Journals, Reports, etc)

- **Reaction mechanisms of inorganic and organometallic systems"**, New York: Oxford University Press, 2007 ISBN 9780195301007

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

"Kinetics and Mechanisms of Reaction of Transition Metal Complexes," Ralph G. Wilkins, 2nd Thoroughly Revised Edition, VCH Publishers, 1992, ISBN 9783527282531 (Online book access at <http://onlinelibrary.wiley.com/book/10.1002/3527600825>)

2- "Ligand Substitution Processes," C.H. Langford and H.B. Gray, W.A. Benjamin, Inc., 1966 (Online book access at

http://caltechbook.library.caltech.edu/100/1/Langford_Lsp.pdf)

3- Lecture Synopsis at <http://www.chem.ox.ac.uk/icl/dermot/mechanism1/>

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

- **Isisdraw and Chemdraw and Chemoffice Software**

<http://scholle.oc.uni-kiel.de/herges/modeling/gliederung.html>

<http://chem-faculty.ucsd.edu/trogler/GroupTheory224/Grouptheory.html>

<http://phycomp.technion.ac.il/~ira/types.html>

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.) - Smart classes are needed equipped with Internet access (scheduled for 3 hours once a week).
2. Computing resources (AV, data show, Smart Board, software, etc.) - Common computer lab containing at least 25 computer sets. - High speed internet access.
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) Required programs specific for chemistry students

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching - Confidential completion of standard course evaluation questionnaire. - Focused group discussion with small groups of students. - Review with the department chairman.
2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department - Observations and assistance from colleagues. - Independent assessment of standards achieved by students. - Independent advice on assignment tasks
3 Processes for Improvement of Teaching - Workshops on teaching methods. - Review of recommended teaching strategies.

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.

- Periodic revision of the course from concerned parties in the department and college, and improving it according to what is known in distinguished universities worldwide.

Name of Instructor: Prof. **Dr. Nashwa El-Metwaly**

Signature: _____ Date Report Completed: **2017**

Name of Field Experience Teaching Staff:

Program Coordinator:

Signature: _____

Date Received: _____

