



Course Specifications

Institution:	Majmaah University.
Academic Department :	Chemistry Department.
Programme :	Chemistry.
Course :	Chemistry of Nuclear and Radiation
Course Coordinator :	Manal Mohamed Salem.
Programme Coordinator :	Gehan Al aemary.
Course Specification Approved Date :	28/ 12 / 1436 H□

A. Course Identification and General Information

1. 1 - Course title :	Nuclear and Radiation Chemistry	Course Code:	Chem 424.																									
2. Credit hours :	(3 □□□)																											
3 - Program(s) in which the course is offered:	Chemistry.																											
4 – Course Language :	Arabic Language																											
2. 5 - Name of faculty member responsible for the course:	Manal Mohamed Salem																											
3. 6 - Level/year at which this course is offered :	level (VIII)																											
7 - Pre-requisites for this course (if any) :																												
8 - Co-requisites for this course (if any) :																												
9 - Location if not on main campus :	College of Education - Zulfi□																											
10 - Mode of Instruction (mark all that apply)□	<table border="1"> <tr> <td>A - Traditional classroom□</td> <td>√□</td> <td>□ What percentage? □</td> <td>20 %□</td> <td>□</td> </tr> <tr> <td>B - Blended (traditional and online)□</td> <td>□</td> <td>□ What percentage? □</td> <td>□</td> <td>□</td> </tr> <tr> <td>D - e-learning□</td> <td>√□</td> <td>□ What percentage? □</td> <td>70 %□</td> <td>□</td> </tr> <tr> <td>E - Correspondence□</td> <td>□</td> <td>□ What percentage? □</td> <td>□</td> <td>□</td> </tr> <tr> <td>F - Other</td> <td>√□</td> <td>□ What percentage? □</td> <td>10%□</td> <td>□</td> </tr> </table>			A - Traditional classroom□	√□	□ What percentage? □	20 %□	□	B - Blended (traditional and online)□	□	□ What percentage? □	□	□	D - e-learning□	√□	□ What percentage? □	70 %□	□	E - Correspondence□	□	□ What percentage? □	□	□	F - Other	√□	□ What percentage? □	10%□	□
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Comments :	□																											

B Objectives

What is the main purpose for this course?

- studying requesting the basics in nuclear and radiation chemistry in addition to radioactivity as well as radioactive decay and the stability of the nucleus
- punctuate interactions and nuclear radiation measuring devices and radioactive sources and radioisotopes and different radiation effects.

Briefly describe any plans for developing and improving the course that are being implemented :

- Adoption of the students themselves in the study,
- The use of effective teaching methods and modern.
- Change the content and updated.

C. Course Description

1. Topics to be Covered

List of Topics	No. of Weeks	Contact Hours
- Introduction to radioactivity ... discovery-degree-definition- stability degree of nucleus	1	3
- radioactive decay particles of alpha-beta-gamma , activation decay , - positron decay – negatron decay- relationship between radioactivity and mass - the composite radioactivity (mixed-sequential decay).electron capture – Law of disintegration- radioactive unit.	3	9
Types of radiation: - radioactive elements natural and industrial and isotopes - definition - types - production of isotopes.	2	6
- The stability of the nucleus - binding energy - converting mass to energy , rates of nuclear decay and different equilibrium and exercises	1	3
- Nuclear Fission: definition, discovery - Bohr theory of nuclear fission - fission products.	1	3
- Nuclear fusion: cycle (proton-proton) - the carbon cycle	1	3
- Nuclear accelerators: the idea of a simplified for use accelerators and reactors in the production of isotopes	1	3
- Neutron sources: from nuclear reactions - spontaneous fission.	1	3
- The interaction of radiation with the material: the interaction of charged particles - electromagnetic radiation reaction	1	3
- Radioactive reagents	1	3
- Radiation monitors	1	3
- Review	1	3

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

<input type="checkbox"/>	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	3 <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	42hrs. <input type="checkbox"/>
Credit	3 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	42hrs





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

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

	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	Knowledge		
1.1	By the end of the course students should be able to:		
1.2			
1.3	• recognize the definition of each from		
1.4	Atom – nucleus		
1.5	• differentiate between the proton and		
1.6	neutron and the mass number.		
1.7	• compare between radioactive elements naturally occurring and industrially	• Lectures	-Work activities
	• differentiate between positron decay and alpha particles.	• Discussion	-Field exercises
		• Experiments	-Periodic tests
		• Researches	-Final tests
1.8	• remember the relationship between the radioactivity and mass		
	• know the binding energy of the nucleus		
1.9	• recognize the interactions of radiation with material		
	• differentiate between the photographic film and Geiger counter and solid reagents		
1.10	• compare between chemical and nuclear reactions,		
	• compare between the solid reactants and reagents semiconductors		
	• recognize Budge film and radiation scanning devices		
	• recognize the scale of the dose and sinus analyst single channel analyzer many channels		
	• remember the effects of radiation random and non-random.		
2.0	Cognitive Skills		
2.1	By the end of the course students should be able to:		
	-Exist the solutions to unexpected problems in creative ways.	-Lectures	- Participate in the Lecture room
2.2	-Use laboratory tools accurately.	-Discussion	- Research in the content.
2.3	- Use the critical and analytical thinking.	-Experiments	- solve problems
		-Researches	



	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
2.4	- analyze the concepts and basics and principles.		<ul style="list-style-type: none">- collective and individual duties.- midterm and final exams
2.5	-Try the figure out the problems contained testing process and how to solve it.		
2.6	-Apply the skills acquired in the academic and professional contexts related to the science of chemistry.		
3.0	Interpersonal Skills & Responsibility		
3.1	By the end of the course students should be able to: Conduct research work as a team.	<ul style="list-style-type: none">-Homework to develop the skills of self-study.-The practical studies as groups.-The work of - Intramural Research-Internet search-PowerPoint Offers.	Follow up experiments in the laboratory , Effective participation within the hall - Assessment research and Review the Collective duties. - The ability to self-Study in the form of homework. Follow up experiments in the laboratory .
3.2			
3.3	Participate Effective in the activities of the methodology.		
3.4	- Learn by self-reliance		
3.5	Assume responsibility and individual responsibility towards society		
3.6	Take individual responsibility and responsibility towards the community with a commitment to the values and ethics that are compatible with Islamic values		
4.0	Communication, Information Technology, Numerical		
4.1	By the end of the course students should be able to: Use of modern communication technologies and information.	Solving problems. Use of the Computer The use of a calculator. Discussion and dialogue	Discussion Monthly tests And Theoretical tests.
4.2	Discuss & dialogue during lectures.		
4.3	Apply the mathematical and statistical methods when solving problems.		
4.4	.....	
4.5	.....		.....
4.6	.....	.....	.....
5.0	Psychomotor		
5.1	Not apply		
5.2			
5.3			





	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
5.6

5. Schedule of Assessment Tasks for Students During the Semester:

	Assessment task	Week Due	Proportion of Total Assessment
1	Midterm First test	V	15%
2	Midterm Second test	X	15%
3	Participation activities students methodological Of scientific research – Entries...	Weekly	10%
4	Final test	XV	60%
6	.....	.....	.....
7	.....	.....	.....
8	.....	.....	.....

D. Student Academic Counseling and Support

- Benefit from the counseling hours
- Communicate with students ☐

E. Learning Resources

1. List Required Textbooks :

Principles of Nuclear Chemistry, T.A.Kandil, the first edition 2001-1424h.

2. foundations of Radiation Physics, d. M. F. Ahmed, A. M. Highway, Second Edition 1419-1998 .

3.Introduction in nuclear and radiation chemistry, A.Suleiman , A. Salem Al-Attas, the first edition 1426-2005.

4 Introduction to the electronic structure of the atom and Nuclear Chemistry, F. M.Hadi, A. H. Shehata, the first edition 1428-2007.

5."Nuclear and Radio Chemistry", G.Fridlandr, J.W.Kennedy SMacias and J.M.Miller BrdEd.John Wily and Son Inc.1981.

6."Nuclear Chemistry", Theory and Applications" GR.Choppin and J.Rydberge Pergamon Press1980.

7."Radiation Chemistry" A.J.Swallow Long man 1973".





2. List Essential References Materials :

1. "Nuclear and Radio Chemistry", G.Fridlandr, J.W.Kennedy SMacias and J.M.Miller BrdEd.John Wily and Son Inc.1981.
 - 2."Nuclear Chemistry", Theory and Applications" GR.Choppin and J.Rydberge Pergamon Press1980.
 - 3."Radiation Chemistry" A.J.Swallow Long man 1973".
- List Recommended Textbooks and Reference Material :**

4. List Electronic Materials :

[www. Science-direct.com](http://www.Science-direct.com).

5. Other learning material :

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F. Facilities Required

1. Accommodation

Lecture room is excellent,
Lecture room contains Platform , smart board, 40 seats,
and curtains in good condition.

2. Computing resources

- Personal.

3. Other resources

Availability of equipment relevant to the course material .

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching:

- Analysis of the results of students in decision .
- Questionnaire a faculty member for the students at the end of the semester.
- Ask a questionnaire that content course for students in the end of the semester .
- Exam Midterm .
- Assess vocabulary scheduled by analyzing workmanship skills among students.





2 Other Strategies for Evaluation of Teaching by the Program/Department

Instructor :

- Peer consultation on teaching ,
- discuss research students with some of the members of the section ,
- Invite specialists and their discussion.

3 Processes for Improvement of Teaching :

- Review of teaching strategies recommended.
- Diversity teaching methods and activating the use of modern technologies
- The formation of the scientific in section of qualified and experienced
- Provide learning resources, especially the library and the Internet.
- Motivate and encourage students to actively participate in the research and experimentation
- Participate effectively in the training courses for the development of the capacities of Professor.
- Training and continuous development
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4. Processes for Verifying Standards of Student Achievement

- check marking by a faculty member of the department for a sample of students
- check marking by an independent faculty member.

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

- Develop appropriate vocabulary and keep pace with changing times
- Reviewing Course Description
- Follow-up in the new effective teaching strategies
- benefit from the development of university courses and activated in educational performance
- Hold workshops to view the results.

Course Specification Approved

Department Official Meeting No (3) Date 28 / 12 / 1436 H

Course's Coordinator

Name : Manal salem
Signature : M.Salem
Date : 28/ 12 / 1436 H

Department Head

Name : Gehan Alaemary
Signature :
Date : 28/ 12 / 1436 H

