



Course Specifications

Course Title:	Radio Nuclear Chemistry
Course Code:	2044110-2
Program:	Bachelor in Chemistry
Department:	Department of Chemistry
College:	College of Sciences
Institution:	Taif University

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A. Course Identification

1. Credit hours: 2 (Theoretical)
2. Course type
a. University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" type="checkbox"/> Others <input type="checkbox"/>
b. Required <input type="checkbox"/> Elective <input checked="" type="checkbox"/>
3. Level/year at which this course is offered: 7 th Level/4 th Year
4. Pre-requisites for this course (if any): NA
5. Co-requisites for this course (if any): NA

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	2 Theoretical hours/ Week	100%
2	Blended	-	-
3	E-learning	-	-
4	Distance learning	-	-
5	Other	-	-

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	30
2	Laboratory/Studio	-
3	Tutorial	-
4	Others (specify)	-
	Total	30

B. Course Objectives and Learning Outcomes

1. Course Description		
This course is designed to give an extensive knowledge of nuclear and radioactivity science, this include nuclear fission and fusion methods, nuclear reactions and applications.		
2. Course Main Objective		
Learning the differences between nuclear and chemical reactions. Classifying nuclear reactions as fission or fusion. Studying about isotopes, nuclear transmutations, half-life, decay and radiation.		
3. Course Learning Outcomes		
	CLOs	Aligned PLOs
1	Knowledge and Understanding:	
1.1	Describe the process used to separate the types of radioactive emissions	K2
1.2	Determine radioactive emissions (alpha, beta, gamma) and binding energy	K3
2	Skills:	

CLOs		Aligned PLOs
2.1	Explain transmutation in nuclear chemistry	S2
2.2	Evaluate the environmental impacts of radioactive materials	S3
3	Values:	
3.1	Illustrate the concept of personal responsibility for achieving duties by teamwork.	V1
3.2	Represent the academic ethics and responsibility	V2

C. Course Content

No	List of Topics	Contact Hours
1	Nuclear Reactions and their Characteristics.	2
2	Nuclear Reactions and Radioactivity.	2
3	Radioactivity and Decay Rates.	2
4	Nuclear Stability and Half-lives.	4
5	Energy Changes During Nuclear Reactions.	4
6	Radioactive series. Radiation detections.	4
7	Nuclear Fission.	4
8	Nuclear Transmutation.	4
9	Detecting and measuring radioactivity.	2
10	Biological Effects of Radiations.	2
Total		30

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	Knowledge and Understanding		
1.1	Define radioactivity natural and artificial, radioactive emissions (alpha, beta, gamma), binding energy.	Lectures	Written exam
1.2	Describe the process used to separate the types of radioactive emissions.	Lectures	Written exam
2.0	Skills		
2.1	Distinguish between natural and artificial radioactivity.	Discussion	Homework Assignments
2.2	Explain transmutation in nuclear chemistry.	Discussion	Homework Assignments
3.0	Values		
3.1	Illustrate the concept of personal responsibility for achieving duties by teamwork.	Collaborative Learning	Individual presentations
3.2	Represent the academic ethics and responsibility	Collaborative Learning	Individual presentations

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Homework Assignments (Electronic)	Throughout Semester	15%
2	Individual presentations	Throughout Semester	5%
3	Periodical Exam	7/8	15%
4	Mid Term Exam	11/12	15%
5	Final exam	16	50%

*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :

Commitment to the rules of the Academic Advising Department at the university in accordance with the academic guidance manual approved by the university and the attached forms, there are different arrangements made by teaching staff to support student consultations including;

- Office hours: 8 hours per a week for each academic member.
- Academic guidance: an academic member has a number of students to guide them throughout degree journey.

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	<ul style="list-style-type: none"> • Chemistry, John McMurry and Robert C. Fay, 2015. Pearson Education (India), Latest Edition. ISBN: 978-0321940872. • Chemistry: The Central Science, Mark Rockley, Amina El-Ashmawy and Julia R. Burdge. Pearson Education (India), Latest Edition. ISBN: 978-0-321-69672-4.
Essential References Materials	<ul style="list-style-type: none"> • Essentials of Physical Chemistry, B. S. Bahl, G. D. Tuli and Arun Bahl, 2014. S. Chand Publishing, Latest Edition. ISBN: 9788121929783.
Electronic Materials	<ul style="list-style-type: none"> • Saudi Digital Library (SDL)
Other Learning Materials	<ul style="list-style-type: none"> • Cyber education chemistry software • Online videos for nuclear chemistry

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	A classroom with movable tables and chairs conducive to group discussion and teamwork.
Technology Resources (AV, data show, Smart Board, software, etc.)	Data show, smart board
Other Resources	--

Item	Resources
(Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of Teaching and assessment	Students	Survey (indirect method)
Extent of achievement of course learning outcomes	Program leader	Reports (Direct method)
Quality of learning resources	Peer referees Students	Reports (Direct method) Survey (indirect method)

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)

Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	Department Council/ Quality assurance committee
Reference No.	7-3-1445
Date	27/2/1445 HJ 12/09/2023 G

