Faculty: Engineering Technology	
Department: Energy	**Program: Bachelor Degree**
Academic year: 2024 - 2025	**Semester: 1^{nd}(Fall)**

Course Plan

First: Course Information

Course No. 0906410	***Course Title: Nuclear Reactions***	***Credit Hours:3***
Prerequisite: 0300122	***Section No.: 1***	***Lecture Time:* 12-11,*Sun,Tue,and Thu***
Type Of Course:	☐ ***Obligatory Faculty Requirement Elective*** ☐ ***University Requirement*** ☐ ***ObligatoryUniversity Requirement*** ☐ ***FacultyRequirement*** ☐ ***Course Elective SpecialtyRequirementObligatorySpecialization requirement***	
Type of Learning:	☒ ***Face-to-Face Learning*** ☐ ***BlendedLearning(2 Face-to-Face + 1Asynchronous)*** ☐ ***Online Learning (2 Synchronous+1 Asynchronous)***	

Second: Instructor's Information

***Name:* Dr. Ayman Amer**			***Academic Rank:* Assistant Professor**		
Office Number:328 l			***Ext. Number:2051***	***E-mail:*** **aamer@zu.edu.jo**	
Office Hours:	***Sunday***	***Monday***	***Tuesday***	***Wednesday***	***Thursday***
	10-11	***1-2***	***10-11***	***1-2***	***10-11***

Third: Course Description

Energetic and kinetics of nuclear reactions and radioactive decay , fission, and reactions of low – energy neutrons ; properties of the fission products and the actinides ; nuclear models and transition probabilities ; interaction of radiation with matter .

Fourth: Learning Source

Main Reference:	**Basic nuclear engineering by a . foster and j. wright**	
***Author:* a . foster and j. wright**	***Issue No.:***	***Publication Year:* (2005)**
Additional Sources&Websites:		
Teaching Type:	☒ ***Classroom*** ☐ ***Laboratory*** ☐ ***Workshop*** ☐ ***MS Teams*** ☐ ***Moodle***	

Fifth: Learning Outcomes

Course Code	***Course IntendedLearning Outcomes (CILOs)***	***Connection To Program ILOs Code***
Knowledge		
**K1	**Explain** the meaning of atomic and nuclear physics and interactions.	*PK1
K2	**Explain** the meaning of radiation physic and detection.	PK2
K3	**Calculate** nuclear thermal efficiency and cooling.	PK3
Skills		
***S1	**Calculate** criticality, control, and nuclear fuel cycle.	PS1
S2	**Calculate** reaction cross-sections , and moderation	PS2
S3	**Apply** characteristics of nuclear fuel materials	PS3
Competencies		
****C1	**Design** fission and fusion reactor physics plant	PC1

*** P: Program, **K: knowledge, ***S: skills, ****C: competencies.**

Sixth: Course Structure

Lecture Date	Intended Teaching Outcomes(ILOs)	Topics	Teaching Procedures*	TeachingMethods***	References***
13/10/2024	A1	Introduction to atomic and nuclear physics	General discussions	Discussion and problem Solving	Energy Engineering
15/10/2024	A1	Introduction to atomic and nuclear physics	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
17/10/2024	A1	Introduction to atomic and nuclear physics	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
20/10/2024	A1	Introduction to atomic and nuclear physics	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
22/10/2024	A1	Introduction to atomic and nuclear physics	At least one exam will be held suddenly during the semester	Discussion and problem Solving	Energy Engineering
24/10/2024	A1	Introduction to atomic and nuclear physics	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
27/10/2024	A1,A2	Atomic structure	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
29/10/2024	A1,A2	Atomic structure	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
31/10/2024	A1,A2	Atomic structure	General discussions	Discussion and problem Solving	Energy Engineering
3/11/2024	A1,A2	Atomic structure	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
5/11/2024	A1,A2	Atomic structure	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
7/11/2024	A1,A2	Atomic structure	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
10/11/2024	A1,A2	Atomic structure	At least one exam will be held suddenly during the semester	Discussion and problem Solving	Energy Engineering
12/11/2024	A1,A2	Atomic structure	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
14/11/2024	A1,A2	Atomic structure	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
17/11/2024	A2,B1	Decay of radioactive nuclei Exam1 (up to end of week 5)	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering

19/11/2024	A2,B1	Decay of radioactive nuclei Exam1 (up to end of week 5)	General discussions	Discussion and problem Solving	Energy Engineering
21/11/2024	A2,B1	Decay of radioactive nuclei Exam1 (up to end of week 5)	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
24/11/2024	A2,B1	Decay of radioactive nuclei Exam1 (up to end of week 5)	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
26/11/2024	A2,B1	Decay of radioactive nuclei Exam1 (up to end of week 5)	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
28/11/2024	A2,B1	Decay of radioactive nuclei Exam1 (up to end of week 5)	At least one exam will be held suddenly during the semester	Discussion and problem Solving	Energy Engineering
1/12/2024	A2,B1	Decay of radioactive nuclei Exam1 (up to end of week 5)	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
3/12/2024	A2,B1	Decay of radioactive nuclei Exam1 (up to end of week 5)	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
5/12/2024	A2,B1	Decay of radioactive nuclei Exam1 (up to end of week 5)	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
8/12/2024	A2,B1	Decay of radioactive nuclei Exam1 (up to end of week 5)	General discussions	Discussion and problem Solving	Energy Engineering
10/12/2024	A2,B1	Decay of radioactive nuclei Exam1 (up to end of week 5)	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
12/12/2024	A2,B1	Decay of radioactive nuclei Exam1 (up to end of week 5)	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering

15/12/2024	B1,B2	Nuclear reactions	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
17/12/2024	B1,B2	Nuclear reactions	At least one exam will be held suddenly during the semester	Discussion and problem Solving	Energy Engineering
19/12/2024	B1,B2	Nuclear reactions	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
22/12/2024	B1,B2	Nuclear reactions	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
24/12/2024	B1,B2	Nuclear reactions	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
26/12/2024	B1,B2	Nuclear reactions	General discussions	Discussion and problem Solving	Energy Engineering
29/12/2024	B2,B3	Radiation detection	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
31/12/2024	B2,B3	Radiation detection	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
2/1/2025	B2,B3	Radiation detection	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
5/1/2025	B2,B3	Radiation detection	At least one exam will be held suddenly during the semester	Discussion and problem Solving	Energy Engineering
7/1/2025	B2,B3	Radiation detection	Review the previous lecture, then explain the current lecture	Discussion and problem Solving	Energy Engineering
9/1/2025	B2,B3	Radiation detection	At least one exam will be held suddenly during the semester	Discussion and problem Solving	Energy Engineering
12/1/2025	B3,B4	Health physics Exam2 (up to end of week 11)	At least one exam will be held suddenly during the semester	Discussion and problem Solving	Energy Engineering
14/1/2025	C1	Neutron interactions	At least one exam will be held suddenly during the semester	Discussion and problem Solving	Energy Engineering
16/1/2025	C1	Neutron interactions	At least one exam will be held suddenly during the semester	Discussion and problem Solving	Energy Engineering

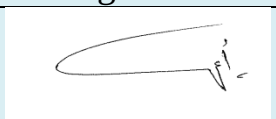
* Learning procedures: (Face-to-Face, synchronous, asynchronous). * * Teaching methods: (Lecture, video…..). ** * Reference: (Pages of the book, recorded lecture, video….).

Seventh: Assessment methods

Methods	Grade	Date	Platform	CLO'S
First Exam	20	Fixed by the Department	Classroom	K،K
Second Exam	20	Fixed by the Department	Classroom	S،S
Assign, Quizzes &Participation	10	During Semester	Classroom+Moodle	All CLOs
Final Exam	50	Fixed by the Department	Classroom	All CLOs

Eighth: Course Policies

- All course policies are applied on all teaching patterns (online, blended, and face-to-face Learning) as follows:
  a. Punctuality.
  b. Participation and interaction.
  c. Attendance and exams.
- Academic integrity: (cheating and plagiarism are prohibited).

Approved by:	Name	Date	Signature
Head of Department	Dr. Ayman Amer	20/11/2024	
Faculty Dean	Prof .Taiseer Alghanim	20/11/2024