



Course Specification

— (Bachelor)

Course Title: Reactor physics
Course Code: 2034217-2
Program: Bachelor in Physics
Department: Physics
College: Science
Institution: Taif University
Version: 2 nd
Last Revision Date: 10/10/2023



Table of Contents

A. General information about the course:	3
B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods	4
C. Course Content	5
D. Students Assessment Activities	5
E. Learning Resources and Facilities	5
F. Assessment of Course Quality	6
G. Specification Approval	6





A. General information about the course:

1. Course Identification

1. Credit hours: (2)

2. Course type

A. University College Department Track Others

B. Required Elective

3. Level/year at which this course is offered: (8th / 4th Year)

4. Course general Description:

Neutron physics , nuclear fission and energy released from it , design of nuclear fission reactors, the four factor formula , nuclear reactor fuel cycle, the reactivity , nuclear reactor safety and control, types of nuclear reactors , breeder reactors , operational reactors around the world.

5. Pre-requirements for this course (if any):

None

6. Co-requisites for this course (if any):

None

7. Course Main Objective(s):

- Explain The Physics Of Neutrons.
- Recognizing The Concepts Of Nuclear Fission Reactions , Types Of Nuclear Fission, Self Sustaining Nuclear Chain Reaction , Energy Released From Nuclear Fission and Fission Products.
- Explain Fission Yield , Neutron Yield, Fission Fragments and Fission Cross –Section.
- Recognizing The Four Factor Formula, Criticality Condition And Reactor Reactivity.
- Explain the Reactor Theory - Diffusion Theory .
- Inspect types of nuclear reactors and the Breeder Reactors.
- Explain the principle of the Control Of Nuclear Reactors , Delayed Neutrons And Reactor Safety.
- Inspect the Nuclear Reactor Fuel Cycle and enrichment.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	30	100%
2	E-learning	--	--
3	Hybrid <ul style="list-style-type: none"> • Traditional classroom • E-learning 	--	--





No	Mode of Instruction	Contact Hours	Percentage
4	Distance learning	--	--

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	30
2.	Laboratory/Studio	-
3.	Field	-
4.	Tutorial	-
5.	Others (specify)	-
Total		45

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Recognize the physical aspects and laws for some bioactivities of the vital organs in the human body.	K1	Lecture	Written exam
1.2	Describe the physical aspects and laws for fluid mechanics in human body.	K3	Lecture	Written exam
2.0	Skills			
2.1	Explain physical phenomena and concepts relevant to the course and their applications.	S3	Lecture	Written exam
2.2	Justify how Medical and Biophysics is essential for technology advances.	S2	Discussion	Quiz
3.0	Values, autonomy, and responsibility			
3.1	Show responsibility for working independently and for continuous improvement of personal capacities.	V1	Group discussion	Essays





Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
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C. Course Content

No	List of Topics	Contact Hours
1	Neutron physics	2
2	Nuclear fission	2
3	The Four Factor Formula, Criticality Condition And Reactor Reactivity.	2
4	The Reactor Theory - Diffusion Theory	4
5	The Nuclear Reactor Fuel Cycle , and enrichment	4
6	Types of nuclear reactors and the Breeder Reactors	4
7	Control Of Nuclear Reactors , Delayed Neutrons And Reactor Safety.	4
8	Neutron physics	4
9	Nuclear fission	
Total		30

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Assignments	Throughout Semester	20
2.	1 st Periodic Exam	7	15
3.	2 nd Periodic Exam	12	15
4.	Final Exam	16	50

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	G. Kessler, Nuclear Fission Reactors, Springer-Verlag Wien, New York , 1983
Supportive References	S. Glasstone And A. Sesonske , Nuclear Reactor Engineering , Van Nostrand Com. New York ,1967
Electronic Materials	
Other Learning Materials	





2. Required Facilities and equipment

Items	Resources
facilities	A classroom with movable tables and chairs conducive to group discussion and teamwork.
Technology equipment	Data show, smart board
Other equipment (depending on the nature of the specialty)	None

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Student Feedback on Effectiveness of Teaching	Students	Indirect
Evaluation of Teaching	Peer reviewer Program coordinator Departmental council Faculty council	Indirect
Improvement of Teaching	Program coordinator Relevant committee	Direct
Quality of learning resources	Students Instructor Faculty	Indirect
Extent of achievement of course learning outcomes,	Program coordinator Instructor	Direct
Course effectiveness and planning for improvement	Program coordinator Instructor	Indirect

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	PHYSICS DEPARTMENT COUNCIL
REFERENCE NO.	NO. 4-45
DATE	27/09/2023 (12/03/1445)

