هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

اعتماد NCAAA T4 2020

Course Specifications

Course Title:	**Reactor physics**
Course Code:	**2034217-2**
Program:	**Bachelor in Physics**
Department:	**Physics Department**
College:	**College of Science**
Institution:	**Taif University**

Table of Contents

A. Course Identification

1. Credit hours: 2
2. Course type **a.** University ☐ College ☑ Department ☐ Others ☐ **b.** Required ☐ Elective ☑
3. Level/year at which this course is offered: 11th level / 4th year
4. Pre-requisites for this course (if any)**: None**
5. Co-requisites for this course (if any)**: None**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	3	100%
2	**Blended**	0	0
3	**E-learning**	0	0
4	**Distance learning**	0	0
5	**Other**	0	0

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	30
2	**Laboratory/Studio**	0
3	**Tutorial**	0
4	**Others** (specify)	0
	Total	**30**

B. Course Objectives and Learning Outcomes

1. Course 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.

2. Course Main Objective

- 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.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Recognize nuclear fission , types , energy released from it and nuclear fission reactors	K1
1.2	Understanding the problems of design and control of the nuclear reactors	K3
2	**Skills :**	
2.1	Formulate the basics of the structure of an atom and nucleus, radioactivity, nuclear reactions	S3
2.2	Solve problems related to design and control of the nuclear reactors	S2
3	**Values:**	
3.1	Show responsibility in working independently with continuous improvement of personal capacities.	V1

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**	4
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	Recognize neutron physics	Lecture	Written exam
1.2	Recognize nuclear fission , types , energy released from it and nuclear fission reactors .	Lecture	Written exam
2.0	**Skills**		
2.1	Show the importance of studying nuclear reactors.	Lecture	Written exam

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
2.2	Understanding the problems of design and control of the nuclear reactors	Discussion	Quiz
3.0	**Values**		
3.1	Show responsibility in working independently with continuous improvement of personal capacities.	Group discussion	Essays

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Activities	Periodically	10%
2	Midterm exam	6th	30%
3	Short exam	9th	10%
4	Final exam	12th	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 :

6 Hours per week during office-hours, in teacher's staffroom or as per the arrangement made by the teacher

F. Learning Resources and Facilities

1.Learning Resources

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

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Lecture room with max 60 seats Labs
Technology Resources (AV, data show, Smart Board, software, etc.)	data show, Smart Board, software
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or	NONE

Item	Resources
attach a list)	

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Student Feedback on Effectiveness of Teaching	Students	Indirect
Evaluation of Teaching	Pear 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

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	
Reference No.	
Date	October 2, 2022