

Zarqa University

Faculty of Engineering Technology
Department: Energy Engineering
Course title: Atomic interactions



Prerequisite:
Instructor: TBD
Lecture's time: T.B.C
Semester: TBD
Office Hours: TBD

Course description:

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

Aims of the course:

- 1- Generating large quantities of electricity is known as base load electricity - reliably without emitting any harmful gases.
- 2- It reduces the environmental impacts, whether on land or natural resources.
- 3- Provide a basic source of heat known as nuclear fission (splitting of atoms).
- 4- Study of radioactive materials and isotopes.
- 5- Building and designing nuclear reactors.
- 6- Finding energy alternatives.

Intended Learning Outcomes (ILOs):

- 1- Ability to know atomic and nuclear physics .
- 2- Ability to know atomic and nuclear interactions .
- 3- Ability to know radiation physic and radiation detection .
- 4 – deriving the equations of neutron interactions , nuclear cross section , and nuclear half lives .
- 5 – Analyzing fission and fusion reactor physics .



Course structures:

Week	C. Hrs	ILOs	Topics	Teaching Procedure	Assessment methods
the first	3	A1	Introduction to atomic and nuclear physical	General discussions	Creative thinking to attract students to specialization
The second	3	A2	Atomic structure	Review the previous lecture, then explain the current lecture	Prepare the matrix from the student
the third	3	A3	Decay of radioactive nuclei	Review the previous lecture, then explain the current lecture	
the fourth	3	B1	Nuclear reactions Exam1 (up to end of week 5)	Review the previous lecture, then explain the current lecture	
Fifth	3	B2	Radiation detection	At least one exam will be held suddenly during the semester	
VI	3	B3	Health physics	Review the previous lecture, then explain the current lecture	
Seventh	3	C1	Neutron interactions Exam2 (up to end of week 11).	Review the previous lecture, then explain the current lecture	
VIII	3	C2	Nuclear reactions	Review the previous lecture, then explain the current lecture	

References: Basic nuclear engineering by a . foster and j. wright (2005)

**Lecturer hand outs: nuclear reactor statics by k.ott,and w.bezella (2004)
nuclear reactor analysis by dudershtat (2007)**

Assessment Methods:

Methods	Grade	Date
First examination	20%	According to faculty time table
Second examination	20%	
Quizzes and Homework	10%	
Final examination	50%	

