

NRE 3112 Nuclear Radiation Detection (Required)

Catalog Description: NRE 3112 Nuclear Radiation Detection (2-3-3)

Prerequisites: NRE 3301 Radiation Physics

A laboratory introduction to the principles and characteristics of basic detectors for nuclear radiation and the electronic systems associated with them.

Textbook: Knoll, G.F., Radiation Detection and Measurement, 3rd Edition, Wiley, 2000.

Topics Covered:

1. General characteristics of radiation detectors
2. Counting statistics and error propagation
3. Gas-filled detectors
4. Scintillation detectors
5. Semiconductor detectors
6. Neutron detection
7. Spectroscopy
8. Electronics
9. Miscellaneous radiation detectors

Course Outcomes:

Outcome 1: The students will have the knowledge on the theory and practice of radiation detection

- 1.1 The students will have the knowledge on how various types of radiation detector work and on the characteristics (e.g. detection efficiency, energy resolution, and response time) for each detector type.
- 1.2 The students will be proficient in setting up radiation measurement systems based on various types of detector, preamplifiers, amplifiers and data acquisition systems (e.g. timers, counters, and multichannel analyzers).

Outcome 2: The students will learn how to write a technical report (i.e. the lab report).

Outcome 3: The students will learn how to work with others in a team.

Correlation between Course Outcomes and Program Educational Outcomes:

NRE 3112 Nuclear Radiation Detection	Outcome a			Outcome b	Outcome c	Outcome d	Outcome e	Outcome f	Outcome g	Outcome h	Outcome i	Outcome j	Outcome k
	i	ii	iii										
Course Outcomes	i	ii	iii										
Course Outcome 1.1		x	x										
Course Outcome 1.2				x									
Course Outcome 2									x				
Course Outcome 3								x					

Prepared by: C-K Chris Wang

Revised: October 2007