1. ER463 Radiation Engineering

2. Credit Hours (3) / Contact Hours (4)

3. Course Director: Joey Latta

4. Textbook: *Radiation Detection and Measurement 4th edition*, G. F. Knoll, 2010 – ISBN 978-0470131480

5. Specific course information

   a. An introductory course in basic radiation detection and measurement systems. Subject areas include radiation statistics, data analysis, gas-filled detectors, scintillation detectors, semi-conductor detectors, gamma and charged particle spectroscopy, signal processing and electronics, neutron detection techniques, activation analysis, neutron generators, and radiation detection applications.
   b. Prerequisites: ER301
   c. Required for Nuclear Engineering program, Elective for other programs.

6. Educational objectives for the course

   a. Demonstrate an understanding and solve problems associated with radiation detection systems including gas filled detectors, scintillation detectors, semi-conductor detectors, and charge particle detectors.
   b. Demonstrate an understanding and solve problems associated with neutron detection and activation analysis.
   c. Demonstrate an understanding and solve problems associated with signal processing for gamma and charge particle spectroscopy.
   d. Demonstrate an understanding and solve problems associated with applications of radiation detection systems.
   e. Demonstrate the ability to use statistical methods to solve radiation engineering problems.
   f. Demonstrate the ability to collect data and analyze experimental results.
   g. Demonstrate the ability to clearly present laboratory results and design projects in written and oral reports.
   h. Demonstrate the ability to contribute to laboratory and design teams.

7. Specific program outcomes address by this course

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Reinforced		x	x		X		x
Mastered	X					x	

8. Brief list of topics to be covered:

a. Radiation Sources and Interactions
b. Radiation Counting Statistics
c. Gas Filled Detectors
d. Scintillation Detectors
e. Shielding
f. Gamma Spectroscopy
g. Semi-Conductor Detectors
h. Neutron Detection and Techniques
i. Liquid Scintillation
j. Neutron Generators
k. Activation Analysis
l. Signal Processing and Electronics
m. Radiation Detection and Applications