# NE 610: Reactor Operations Virtual Laboratory
# Spring 2013

**2010-2011 Catalog Data:** NE 610. Reactor Operations Virtual Laboratory. (1) II. Theory and measurement of parameters of fundamental importance to nuclear reactors and their operation. Review of reactivity and criticality and overview of reactor dynamics, control, and temperature coefficients. Reactor virtual experiments on approach to criticality, control rod calibration, and fuel temperature coefficient of reactivity. Two hours lecture and one virtual laboratory experiment per week. Pr.: NE 500.

**Textbook:** None

**Instructors**:

William L. Dunn, 137 F Ward Hall, Kansas State University; (785) 532-5628; dunn@mne.ksu.edu
Steven Biegalski, University of Texas—Austin, biegalski@mail.utexas.edu
Dan Reece, Texas A&M University, w-reece@tamu.edu

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| **Schedule:** | 22 January – 22 February 2011<br>Lectures and experiments on-line |
| **Evaluation:** | Lab reports 90%<br>Participation 10% |
| **Prerequisites by Topic:** | Knowledge of elementary nuclear physics; understanding of and ability to use basic radiation detectors |
| **Course Objectives:** | The basic objective is to engage the student in learning about the operation of nuclear reactors. After successfully completing the course, the student will be able to:<br>1. describe and understand fundamental reactor physics experiments. [a]<br>2. analyze data to estimate reactor parameters and the uncertainty in the estimates of those parameters. [a, g, k]<br>3. understand basic reactor operation. [a, j]<br>***Note: Letters in brackets correlate course objectives to program outcomes.*** |
| **Topics Covered:** | 1. Introduction to the course and to research reactors<br>2. Reactor criticality (1 week)<br>3. Measurement of control rod worth (1 week)<br>4. Temperature coefficient of reactivity (1 week) |
| **Contribution to Professional Component:** | This is an elective nuclear engineering course that deals with experiments involving operation of nuclear reactors. This course prepares students to perform experiments, prepare laboratory reports, and understand the sources of measurement errors. |
| **Relationship to Program Outcomes:** | Correlations to program outcomes are made in the course objectives above. The course requires application of scientific knowledge, an ability to conduct experiments, and effective communication of results. The course also considers safety of nuclear reactors and thermal and mechanical means for reactor control. |
| **Prepared by:** | William L. Dunn, 12/30/2012 |

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