Materials Performance in Advanced Nuclear Reactors

NE XXX

1. **Course Overview**

In this course we will study the

XXXX

1. **Learning Outcomes**

By the end of this course, the student should be able to:

1. XXXXX
2. **Pre- or Co-Requisites**

NE 201

1. **Required Text(s)**

None.

Supplemental texts:

Light Water Reactor Materials, Vol. 1 Fundamentals, D. Olander and A. Motta

Nuclear Fuel Elements, B. Frost

Fundamentals of Radiation Materials Science, G. Was

1. **Course Requirements**

Examinations: Exam 1: 20 %; Exam 2: 20 %, Exam 3: 20 %

Projects: Presentation report 1: 10 %; Presentation report 2: 10 %; Final Project: 20 %

1. **Topical Outline:** 
   1. Introduction and Overview
   2. Advanced Reactor Systems, Advanced Fuel types
   3. TRISO particles
      1. CO production
      2. Fission gas release
      3. Fission Product Attack
      4. IPyC, OPyC and SiC stress state and fracture
   4. U-Zr (U-Pu-Zr) metallic fuel
      1. Fission gas swelling and release
      2. Constituent redistribution
      3. FCCI
      4. Alpha tearing
   5. Molten salts
      1. Thermophysical properties
      2. Corrosion of structural components
   6. U-Mo and U-Si
      1. Monolithic and Dispersion Fuels
      2. Fission Gas superlattice
      3. Recrystallization, grain refinement and amorphization
   7. Sdfsdfs
2. **Grading**

Letter Grade Percent Grade

A+ 98-100; A 93-97; A- 90-92; B+ 87-89; B 83-87; B- 80-82; C+ 77-79; C 73-76; C- 70-72; D+ 67-69; D 63-66; D- 60-62; F Below 60