

NUCE 512 – Nuclear Reactor Statics and Fuel Management

(Fall 2008)

Description: Steady State Core Calculations and In-core Fuel Management

Instructor: Dr. Kostadin Ivanov (kni1@psu.edu, (814) 865-0040, Nuclear Engineering Program, Mechanical and Nuclear Engineering Department, 206 Reber Building, University Park)

Time and Location:

T R 01:00P - 02:15P	327 SACKETT
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Instructor's Office Hours: M 10:30A – 12:00 A, 206 Reber

TA: Federiko Puente Espel (fup104@psu.edu). (814) 863-3926, 334 Reber Building

Text:

1. Class Notes and Handouts

References:

1. G. Cochran, and N. Tsoulfanidis, “The Nuclear Fuel Cycle: Analysis and Management”, ANS 2002.
2. M. Driscoll, T. Downar, and E. Pilat, “The Linear Reactivity Model for Nuclear Fuel Management”, ANS, 1990.
3. K. Ott, and W. Bezella, “Introductory Nuclear Reactor Statics”, ANS, 1983.
4. R. J. Stamm'ler, and M. Abate, “Methods of Steady State Reactor Physics in Nuclear Design”, Academic Press, 1983.
5. P. Silvennoinen, “Reactor Core Fuel Management”, Pergamon Press, 1976

Grading:

- 30% - Homework
- 35% - Project
- 35% - Exam

List of Topics

1. Introduction to Fuel Management
2. Variables of Core Management
3. Reactor Core Analysis
4. Multi-Group Diffusion Theory
5. Nuclear Cross-Section Data
6. Lattice Physics Calculations and Cross-Section Generation
7. Cross-section Parameterization and Cross-Section Libraries
8. Core Simulation and Nodal Methods
9. Core Burnup and Fuel Depletion Modeling
10. Fundamentals of Reactor Reload Calculations
11. Models for In-Core Fuel Managements
12. PWR In-Core Fuel Management
13. BWR In-Core Fuel Management
14. Fuel Management of Other Reactor Types
15. Optimization of Core Re-load Designs and Burnable Poison Placement
16. Nuclear Fuel Cycle and Economics