Texas A&M University

Departmental Request for a New Course

Undergraduate • Graduate • Professional

• Submit original form and attach a course syllabus.

1. This request is submitted by the Department of Nuclear Engineering

2. Course prefix, number and complete title of course: NUEN 661 Nuclear Fuel Performance

3. Course description (not to exceed 50 words): This course will review the basic phenomena that govern nuclear fuel performance. This includes structural changes and rate controlling phenomena for oxide and metal fuels as well as cladding and other structural materials.

4. Prerequisite(s): Graduate Standing or Consent of the Instructor

Cross-listed with: n/a

Cross-listed courses require the signature of both department heads.

5. Is this a variable credit course? □ Yes ☑ No If yes, from ________ to ________

6. Is this a repeatable course? □ Yes ☑ No If yes, this course may be taken ________ times.

Will this course be repeated within the same semester? □ Yes ☑ No

7. Has this course been taught as a 489/689? □ Yes ☑ No If yes, how many times? __________

Indicate the number of students enrolled for each academic period it was taught. Fall 2007 (14)

8. This course will be:

a. required for students enrolled in the following degree program(s) (e.g., B.A. in history)

b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)

M.S., Ph.D. in Nuclear Engineering

9. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments. Attach approval letters.

10. Prefix Course # Title (excluding punctuation)

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Approval recommended by:

Head of Department 1/26/09

Head of Department (if cross-listed course) Date

Submitted to Coordinating Board by:

Associate Director, Curricular Services Date

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra.williams@tamu.edu.

Curricular Services – 10/08
Texas A&M University
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Undergraduate • Graduate • Professional
Submit original form and attach a course syllabus.

1. This request is submitted by the Department of Nuclear Engineering

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4. Prerequisite(s) Graduate Standing or Consent of the Instructor

5. Is this a variable credit course? ☐ Yes ☑ No If yes, from ______ to ______.

6. Is this a repeatable course? ☑ Yes ☐ No If yes, this course may be taken ______ times. Will the course be repeated within the same semester/term? ☐ Yes ☑ No

7. Has this course been taught as a 289/489/689? ☑ Yes ☐ No If yes, how many times? ______. If the number of students enrolled for each academic period it was taught: Fall 2007 (14)

8. This course will be:
   a. required for students enrolled in the following degree program(s) (e.g., B.A. in history)
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10. Prefix Course # Title (excluding punctuation) Lect. Lab SCH Subject Matter Content Code Admin. Unit Acad. Year FICE Code Level
    NUEN 661 Nuclear Fuel Performance 03 00 02 14 23 01 1000 09 09 10

Approval recommended by:

Head of Department 7/29/08

Chair, College Review Committee 10-31-08

Dean of College 10-31-08

Dean of College 12/4/08

Submitted to Coordinating Board by:

Director of Academic Support Services

Questions regarding this form should be directed to Sandra Williams at 845.8836.
OAR/AS – 04/07
2 of 5 B
Course title and Number: NUEN 661 – Nuclear Fuel Performance
Term (e.g., Fall 200X): Fall 2009
Meeting times and location:

Course Description and Prerequisites
Review of the basic phenomena that govern nuclear fuel performance. Including structural changes and rate controlling phenomena for oxide and metal fuels as well as cladding and other structural materials.

Prerequisites: Graduate Standing or Consent of the Instructor

Learning Outcomes or Course Objectives

Instructor Information
Name: Sean McDeavitt
Telephone Number: 862-1745
Email address: mcdeavitt@tamu.edu
Office Hours: Open door policy
Office Location: ZACH 122F

Textbook and/or Resource Materials
Reference Texts: FRAPCON Manuals (available online @ http://www.pnl.gov/frapcon3/)
... and others

Course Web Page: WebCT
(Lectures, HW information, selected readings and grades posted here)

References: Online Periodic Table, http://www.webelements.com/
Online Table of the Nuclides, http://atom.kaeri.re.kr/

Grading Policies
Grading: The course grade will be based upon homework assignments and three exams. The first two exams will be taken in class and the last exam will be taken during the scheduled final exam period.

- Homework 20%
- Group Lecture I 25%
- Group Lecture II 25%
- Final Exam 30%

Grading is expected to be on a straight 90/80/70/60 scale.

Group Lecture: The class will be divided into 5 groups. Each group will prepare two 75 minute topical lectures on nuclear fuel performance modeling describing actual models, data and an assessment of the model’s efficacy. (see class schedule for list of topics.) The instructor will lecture on the basic phenomena being covered on Mondays and the topical group lectures will be presented on Wednesdays, according to the class schedule.

Homework: Homework will be assigned in-class with a 1-week turnaround time.

Guidelines for homework preparation:
- Show all work, not just the final answer.
- Present your work neatly (extremely “messy” work will not be graded)
- Staple all pages together (2% penalty)

Final Exam: The final exam may consist of true/false questions, multiple choice questions, short answer problems, and problem solving calculations.

Course Topics, Calendar of Activities, Major Assignment Dates

Class Topic List

1. Nuclear Fuel Materials (Oxide, Metal, other)
2. Fuel Fabrication
3. Overview of Fuel Performance
4. Fuel Performance Codes
5. Fission Gas Release
6. Fuel Pellet Thermal Conductivity
7. Fuel Swelling
8. Fuel Cracking and Restructuring
9. Fuel Power and Burnup Radial Distribution
10. Interface Contact Resistance
11. Cladding Swelling
12. Cladding Waterside Corrosion
13. Cladding Fretting, Wear and Shadow Corrosion
14. Metal or TRISO Fuel Performance

Nominal time spent is 1 week per Topic. Items 5 to 14 involve student lectures on each topic.

Other Pertinent Course Information

None

Americans with Disabilities Act (ADA)

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation
requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information visit [http://disability.tamu.edu](http://disability.tamu.edu)

**Academic Integrity**

*For additional information please visit: [http://www.tamu.edu/aggiehonor](http://www.tamu.edu/aggiehonor)*

“An Aggie does not lie, cheat, or steal, or tolerate those who do.”