Syllabus
ENME 489T Nuclear Reactor Design
All Sections
Spring 2016

Course Information

Location and Time

Classroom: JMP 2121
Time: MW 11:00am – 12:15pm

Instructor Information

Instructor: Dr. Robert C. Sanders
Office: 1181 Engineering Lab
Email: rsanders@umd.edu
Phone: 443-804-6485
Office Hours: MW 12:30pm – 1:30pm, or by appointment

ELMS Site

ENME489T All Sections – Spring 2016: Nuclear Reactor Design

Required Textbook

Lamarsh and Baratta, Introduction To Nuclear Engineering, Third Edition

Required Technology

All students are required to have a calculator.

Communications

Communications outside the classroom will be via email and/or the ELMS site.

Emergency Protocol

In the event of an emergency that closes the university for an extended period of time, lectures, homework assignments and exams will be posted on the ELMS site. Students will provide the instructor with completed homework assignments and exams via email.
Course Description, Goals and Expectations

Course Description

ENME 489T presents the principles of nuclear reactor engineering as applied to reactor power plants. This includes nuclear reactor system design (reactor types and functional requirements of reactor systems), nuclear reactor materials (fuels, moderators, coolants, cladding and structural materials), nuclear reactor thermal-hydraulics, nuclear reactor shielding, nuclear reactor mechanical design (pressure vessels, piping, fuel), nuclear reactor safety analysis (types of accidents that must be considered during nuclear reactor design) and nuclear reactor accident consequence analysis (estimation of dose rates following a nuclear reactor accident).

Course Goals

The major objective of ENME 489T is to have the student understand the fundamental concepts of nuclear reactor design in addition to the fundamental nuclear reactor physics concepts learned in ENME 430. A student who successfully completes ENME 489T is able to demonstrate the ability to:

1. Understand the heat generation rate in a nuclear reactor, including the maximum allowable heat generation rate.

2. Understand the basic requirements for materials used in nuclear reactors, including fuel materials, coolant materials, moderator materials and structural materials.

3. Perform basic thermal-hydraulic calculations associated with the reactor core, including temperature distributions and required coolant flow rate.

4. Perform basic nuclear reactor shielding calculations.

5. Perform basic structural calculations for pressure vessels and piping used in nuclear reactors.

6. Perform basic radiation dose calculations for radioactive materials that are released from a nuclear reactor following an accident.

Course Schedule

During each class meeting the instructor will present information that supplements and clarifies the information presented in the course textbook. Students are expected to ask questions if additional clarification is needed.
Due Dates

Homework: Homework assignments are due at the beginning of class on the specified due dates. To be fair to all students, late homework will not be accepted under any circumstances.

Midterm Exams: Two midterm exams will be given during the semester. The tentative dates for the midterm exams are:
   Exam 1: February 29, 2016
   Exam 2: April 4, 2016

Final Exam: May 14, 2016.

Expectations for Students

Students are expected to attend class on a regular basis. Students are also expected to complete all homework assignments, both midterm exams, possible unannounced quizzes and the final exam.

Grading Procedure

Homework: In order for the student to better understand the material presented in class, homework will be assigned. Problem sets (collected at the beginning of the class on the due date) will be worth 10 points each. Most homework assignments will not be graded in detail and all students that make an honest effort to complete a homework assignment will receive 10 points for the assignment. However, on a random basis, some homework assignments will be selected for detailed grading. Solutions to all homework assignments will be posted on the ELMS site. Students can work together; however, copying homework is a violation of the Student Code of Academic Integrity – any occurrences will be referred to and dealt with by the Student Honor Council. In fairness to all students in the class, late homework assignments will not be accepted under any circumstances.

Midterm Exams: There will be two one-hour midterm exams. Each hour exam will concentrate on the subject matter covered since the previous exam. However, keep in mind that engineering material builds on itself as a course progresses. Students are expected to have mastery of all previous material. Each midterm exam is worth 100 points.

Quizzes: Unannounced quizzes may be given at random times during the semester. If given, each quiz will be worth 10 points.

Final Exam: The final exam will be cumulative and cover all course material. The final exam is worth 200 points.
The student’s final grade will be determined based on all course work. The final grade is determined only after all course work is completed (i.e. after the final exam).

The final grade will be determined using the following points:

<table>
<thead>
<tr>
<th>Points</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework:</td>
<td>100</td>
</tr>
<tr>
<td>Midterm Exam 1:</td>
<td>100</td>
</tr>
<tr>
<td>Midterm Exam 2:</td>
<td>100</td>
</tr>
<tr>
<td>Quizzes:</td>
<td>10 per quiz</td>
</tr>
<tr>
<td>Final Exam:</td>
<td>200</td>
</tr>
<tr>
<td>TOTAL:</td>
<td>500 + 10 per quiz</td>
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Course Procedures and Policies

Course Attendance Policy

Class attendance will not be recorded on a regular basis; however, students are strongly encouraged to attend all classes since some of the material covered during the exams is presented in the classroom and not included in a course textbook. Also, unannounced quizzes may be given at random times during the semester.

Written Absence Policy

All students are expected to attend class on the scheduled days for the midterm and final exams. Absences will be granted only in extreme situations such as illness or personal emergency. In such situations, the student must provide the instructor with a written document signed by a physician, or other authorized official, explaining why the student was not able to take the exam at the scheduled time. A makeup time for the missed exam will be mutually agreed to by the student and the instructor.

If a student anticipates in advance that he or she cannot attend class for a scheduled exam, it is the student’s responsibility to notify the instructor in advance so that a makeup exam can be scheduled. Failure to do so will result in a score of zero for the missed exam.

Academic Integrity Expectations

The University has a nationally recognized Honor Code, administered by the Student Honor Council. The Student Honor Council proposed and the University Senate approved an Honor Pledge. The University of Maryland Honor Pledge reads:

I pledge on my honor that I have not given or received any unauthorized assistance on this assignment/examination.

Unless you are specifically advised to the contrary, the Pledge statement should be handwritten and signed on the front cover of all papers, projects, or other academic
assignments submitted for evaluation in this course. Students who fail to write and sign the Pledge will be asked to confer with the instructor.

**Arrangements for Students with Disabilities**

Academic accommodations for students with disabilities will be provided as directed by a signed statement from the university Disability Support Service.

**Copyright Notice**

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