

NRE 4266 – Light Water Reactor Technology (Fall 2026)

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Office Location: Boggs 3-85

Office Hours: T/Th 1:30 – 3:30 or by appointment (always best)

I am happy to meet in-person, over the phone, or via Teams or some other platform

Course Description

This course consists of a systematic survey of the technology of both pressurized and boiling water reactors with emphasis on the nuclear steam supply system and its associated safety and control systems.

Prerequisites

NRE 2120 – Elements of Nuclear Science and Engineering

Course Details

Term: Fall 2026

Course name: Light Water Reactor Technology

CRN: 94383

Course number: NRE 4266

Section number: A

Meeting times: Tuesday/Thursday 3:30 pm – 4:45 pm

Room building & number: Howey Physics N210

Learning Objectives

Upon successful completion of this course, students should be able to:

1. Understand design characteristics of nuclear reactor systems
2. Understand the balance of plant layout for LWRs
3. Use various control room simulator software to characterize and predict system performance during nominal and transient situations
4. Use various control room simulator software to respond to system changes during various transient situations

Textbook

None. Certain book chapters, manuals, and/or papers will be provided on Canvas. Canvas will be used as the course website to communicate with the students.

Grading

Midterm: 20%

Homework: 10%

Projects: 50%

Final Project: 20%

Grade Scale: A: (90-100), B: (80-89), C: (70-79), D: (60-69), F: (0-59)

Attendance Policy

Students are expected to attend all classes for their full length. If a student is unable to attend a class for whatever reason, it is the student's responsibility to acquire any missed notes, lecture materials, or other

information disseminated in class.

Homework

Regarding late work: I realize that unforeseen events happen and situations arise. Late work can be turned in within 24 hours of the due date for a maximum grade of 50%. The assignment will not be accepted after 24 hours from the due date and will receive a zero. However, there are times when I will review the homework within this 1-day window. If this happens, then I can no longer accept the assignment, and it will automatically receive a zero. Obviously, there are exceptions at my discretion, but if something comes up that hinders you from turning in the HW on time, the earlier you let me know the better chance I can accommodate you.

Points awarded on Homework assignments will sum to give the total towards the final grade. For example, if you have the following scores:

HW1: 42/45

HW2: 55/55

HW3: 0/55

Fraction of total points earned: $\frac{42+55+0}{45+55+55} = 0.64$

Total HW points towards final grade: $(0.64)(10) = 6.4$

Project Assignments

Many projects will be given throughout the term, and details will be given out later since the exact nature of the project(s) may vary depending on how the semester unfolds. These will involve the use of various control room simulator software.

Points awarded on Project assignments will sum in a similar fashion to that of the homework.

Midterm and Final Exam

All students are expected to be present at the time exams are given. Students not present at the time an exam is given will receive a “0” for that exam. No make-up exams will be given unless the student makes arrangements with the instructor prior to the exam date to receive an excused absence. The students will be informed when an exam will take place at least one week before the exam. The format for the tests and the final will be explained at this time.

Extra Credit

Certain homework and exams may have extra credit problems that the student can choose to perform if they wish. There will NOT be an extra credit assignment.

Cheating & Honor Code

Students are expected to abide by all policies set by the instructor regarding what is permitted and what is not permitted for all assignments. Unless explicitly stated otherwise, students must **always** abide by the following:

- Homework: students can work alone or in groups, but each student must submit only their individual work. Copying is never allowed.
- Quizzes: students must work alone. Students cannot seek outside assistance and can only ask the instructor for guidance/help.
- Tests/Final: students must work alone. Students cannot seek outside assistance and can only ask the instructor for guidance/help.

Outside assistance includes utilization of websites and other tools. If you are unsure of something, just ask.

Violation of any of the above will constitute a “0” grade on the assignment as well as notification of the College Dean and Department Head.

The Honor Code can be found at: <http://www.honor.gatech.edu>

Course Outline

Week	Description	
1	Introduction & Scope; Reactor Descriptions	
2	PWR Design and Characteristics	
3	PWR Balance of Plant and NSSS	
4/5	PWR Software Workshops (student presentations)	
6	BWR Design and Characteristics	
7	BWR Balance of Plant and NSSS	
8/9	BWR Software Workshops (student presentations)	
10	Midterm	
11	Novel System Software Workshops	
12	Software Workshops (students lead)	
13	TBD	
14	TBD	
15	TBD	
	Review	
	Final Exam: none (a final project will be required) See Registrar for official listing	

The above schedule is tentative, and subject to change at any time.

Additional Information

GT Policy on Accommodations for Students with Disabilities

If you are a student with learning needs that require special accommodations, contact the Office of Disability Services at (404) 894-2563 or <http://disabilityservices.gatech.edu/>, as soon as possible, to make an appointment to discuss your special needs and to obtain an accommodation letter. Please also e-mail me as soon as possible to set up a time to discuss your learning needs.

GT Policy on Excused Absences for Religious Observances

Georgia Tech policy on excused absences for religious observances: <http://www.catalog.gatech.edu/rules/4/>: “Students who are absent because of participation in a particular religious observance will be permitted to make up the work missed during their absence with no late penalty, provided the student informs the course instructor of the upcoming absence, in writing, within the first two weeks of class, and provided the student makes up the missed material within the timeframe established by the course instructor.”

GT Policy on Absences for Medical Reasons

GT policy on absences for medical reasons. <http://www.catalog.gatech.edu/rules/4/> Students will work with the Office of VP for Student Life (Dean of Students) to have them verify that the student was ill 3 and to determine the severity of the problem; the Dean’s office will then interact with the instructor(s) if necessary. To the extent possible, requests from the Office of the Dean of Students to excuse a medical emergency or illness and allow make-up of the work missed, including homework, examinations, or other class assignments will be accommodated.

Policy on Unforeseen or Emergency Situations

If due to an unfortunate unplanned emergency such as a car accident, a theft or burglary in your apartment,

you are unable to attend an exam at the last minute, a police report substantiating the accident or mishap must be provided. Requests for accommodating an absence that are made after the exam will under almost all circumstances, without the above documentation, not be honored. Under the unlikely and highly discouraged event that you have to miss the final exam, alternate arrangements will be made on a case-by-case basis, including, but not limited to, a one-on-one oral exam of appropriate duration, to test your knowledge in the subject matter.

Student-Faculty Expectations Agreement

At Georgia Tech, we believe that it is important to strive for an atmosphere of mutual respect, acknowledgement, and responsibility between faculty members and the student body. See <http://www.catalog.gatech.edu/rules/22/> for an articulation of some basic expectation that you can have of faculty and that faculty have of you. In the end, simple respect for knowledge, hard work, and cordial interactions will help build the environment we seek. Therefore, we encourage you to remain committed to the ideals of Georgia Tech while in this class.

Campus Resources for Students

The CARE Center and the Counseling Center, Stamps Health Services, and the Dean of Students Office will offer both in-person and virtual appointments. Student Center services and operations are available on the Student Center website. For more information on these and other student services, contact the Dean of Students or the Division of Student Life.

Mental Health & Wellness

As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, depression, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce a student's ability to participate in daily activities. GT offers services to assist you with addressing these and other concerns you may be experiencing. If you or someone you know is experiencing any of the issues noted above, consider utilizing the confidential mental health services available on campus. I encourage you to reach out to GT CARE (www.care.gatech.edu, 404-894-3498) or the Counseling Center (www.counseling.gatech.edu, 404-894-2575) for support. An on-campus counselor or after-hours services are available to assist you.