# Nuclear and Radiological Engineering Laboratory 1

ENU 4505L Sections 11603, 20423, 27201

***Class Periods:*** Tuesday, Period 4, 10:40 – 11:30 am, all sections
Wednesday, Periods 3 – 4, 9:35 – 11:30 a.m., Section 20423
Wednesday, Periods 5 – 6, 11:45 a.m. – 1:40 p.m., Section 27201
Thursday, Periods 3 – 4, 9:35 – 11:30 am, Section 11603

***Location:*** Tuesday, McCarty A, Room 2196, all sections
Wednesday and Thursday, Rhines B17 or UFTR facility, all sections

***Academic Term:*** Spring 2026

***Instructor:***
Donald Wall
Donald.wall@ufl.edu
Office Phone Number: 352-294-2106
Office Hours: Thursday, 8:00 – 9:00 a.m., UFTR facility

***Teaching Assistant/Peer Mentor/Supervised Teaching Student:***
Please contact through the Canvas website

- No Teaching Assistant. UFTR staff will assist with some exercises

***Course Description***
Two one-hour lectures discussing experimental procedures used in reactor operation, personnel monitoring, radiation detection devices and the statistics of nuclear counting systems. Also includes a four-hour laboratory experience that integrates practical applications of radiation sources, radiation interactions, radiation transport and radiation diction.

*Instructors note: The University requires that the course description in the syllabus must exactly match the description provided by the Registrar. The preceding description states that there are two one-hour lectures and a four-hour laboratory experience. The course is scheduled for a one hour lecture each week and each lab section is two hours per week.*

*And finally, there is no such thing as "radiation diction" unless we are to conclude that radiation has a reasonable ability to speak with appropriate pronunciation and enunciation. Oh well, stranger things have happened. Perhaps radiation does speak with appropriate diction, and I never noticed.*

***Course Pre-Requisites / Co-Requisites***
Prerequisite: ENU 4612, Nuclear Radiation Detection and Instrumentation

***Course Objectives***
Students will get both classroom-based academic instruction and hands-on experience at the University of Florida Training Reactor (UFTR) facility. The classroom portion is designed to set the stage for the laboratory exercises. The laboratory exercises will include handling and measurement of radioactive materials and observation and measurement of UFTR operating characteristics. There might be some radiation diction thrown in for the sake of completeness.

The course objectives include developing proficiency in:

- Experimental design
- Safe handling of radioactive materials

- Measurement of operating characteristics of a research reactor

The objectives will be met by a combination of individual study, classroom presentations and participation and hands-on experience with the UFTR.

***Materials and Supply Fees***

There is a laboratory fee of $50.00

***Relation to Program Outcomes (ABET):***

| Outcome | Coverage* |
|---|---|
| 1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics | |
| 2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors | |
| 3. An ability to communicate effectively with a range of audiences | |
| 4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts | |
| 5. An ability to function effectively on a team whose members together provide leadership, create a collaborative environment, establish goals, plan tasks, and meet objectives | |
| 6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions | High |
| 7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies | Medium |

*Coverage is given as high, medium, or low. An empty box indicates that this outcome is not covered or assessed in the course.

***Required Textbooks and Software***

None. Study materials will provided as electronic files, and will be distributed via Canvas.

***Recommended Materials***

- Radiation Detection and Measurement, 3rd (2000)or 4th edition (2010)
- Glenn F. Knoll
- ISBN number: 978-0470131480 (2010 edition)

***Required Computer***

Recommended Computer Specifications: https://it.ufl.edu/get-help/student-computer-recommendations/
*HWCOE Computer Requirements: https://www.eng.ufl.edu/students/advising/fall-semester-checklist/computer-requirements/*

***Course Schedule***

| Date | Topic | Comments and Due Dates |
|---|---|---|
| Week of Jan. 12 | • Report writing standards will be discussed in the lecture session.<br>• No lab this week. | UFTR unavailable this week |
| Week of Jan. 19 | 1. HPGe calibration and use | |
| Week of Jan. 26 | 2. Neutron activation | HPGe calibration report due |
| Week of Feb. 2 | 3. Reactor core flux measurement | UFTR limited availability this week<br>NAA report due |
| Week of Feb. 9 | 4. reactor core flux measurement | |
| Week of Feb. 16 | 5. approach to critical | Core flux report due |
| Week of Feb. 23 | 6. blade worth measurements | Approach to critical report due |
| Week of Mar. 2 | blade worth measurements | |
| Week of Mar. 9 | 7. Shutdown margin | Blade worth report due |
| Week of Mar. 16 | **Spring break, no classes** | |
| Week of Mar. 23 | 8. excess reactivity | |
| Week of Mar. 30 | 9. hot channel factor | Shutdown margin and excess reactivity (as one combined report) due |
| Week of Apr. 6 | hot channel factor, continued | |
| Week of Apr. 13 | 10. hot cell exercise | • Hot channel factor report due.<br>• Writing assignment due April 15<br>• Hot cell exercise done in class. No submission required for hot cell exercise. |
| Week of Apr. 20 | Make up period | |
| Week of Apr. 27 | final exam week | no final exam for this course |

Instructor's note on the schedule: the weekly schedule is subject to change due to availability of the UFTR and associated equipment. The schedule will *very likely* change.

***Important Dates***
*Final Exam: there is no final exam for this course.*

***Evaluation of Grades***
There are eight laboratory reports and one writing assignment for this course. There are no quizzes or exams. The grade for the course will be based only on the score for the eight laboratory reports and the writing assignment.

| Assignment | Total Points | Percentage of Final Grade |
|---|---|---|
| Assignments (8) at 100 points each | 800 | 80% |
| Writing assignment | 200 | 20% |
| Total | 1000 | 100% |

***Grading Policy***

| Percent | Grade | Grade Points |
|---|---|---|
| 93.4 - 100 | A | 4.00 |
| 90.0 - 93.3 | A- | 3.67 |
| 86.7 - 89.9 | B+ | 3.33 |
| 83.4 - 86.6 | B | 3.00 |
| 80.0 - 83.3 | B- | 2.67 |
| 76.7 - 79.9 | C+ | 2.33 |
| 73.4 - 76.6 | C | 2.00 |
| 70.0 - 73.3 | C- | 1.67 |
| 66.7 - 69.9 | D+ | 1.33 |
| 63.4 - 66.6 | D | 1.00 |
| 60.0 - 63.3 | D- | 0.67 |
| 0 - 59.9 | E | 0.00 |

***Writing Requirement***
This course includes a writing requirement of 4000 words. The structure of the assignment and grading rubric will be discussed in class.

The following text is directly from the UF UGRD catalog:

> *The writing course grade assigned by the instructor has two components: the writing component and a course grade. Therefore, to receive writing credit, students must satisfactorily complete the writing component and receive a minimum grade of C (2.0) for the course. It is possible to not meet the Writing Requirement and still earn a minimum grade of C in a class, so students should review their degree audit after receiving their grade to verify receipt of credit for the writing component.*
>
> *Courses intended to satisfy the Writing Requirement may not be taken S/U.*
>
> *The writing must be evaluated on content, organization and coherence, effectiveness, style, grammar, and punctuation. Assignments must be returned to students with a grade and comments that address the students' writing skills. Consequently, feedback on all assignments should be provided by the last day of class, or if provided electronically, by the end of finals.*
>
> *Evaluation of writing is based on individual work. Class notes, quizzes and in-class writing assignments or essay examinations may not be counted. Team-written documents may not be counted for credit unless clear individual sections are identified for grading, such that an individual*

*student's writing may be evaluated and graded. Drafts cannot be counted separately from final drafts as part of the total number of words completed during the course.*

***Academic Policies & Resources***

Please consult this link for academic policies and campus resources: https://go.ufl.edu/syllabuspolicies.

**Late assignments***: Late assignments will not be accepted unless prior arrangements are made with the instructor. Late assignments might be accepted, at the instructors discretion, for compelling, verifiable reasons that are consistent with UF policies. Late assignments will be given a score of zero. In conclusion a single late assignment incurs a significant penalty for an individual's grade given that each assignment is worth 10% of the total grade. It would be better to turn in something, even if incomplete, than to take a zero on an assignment.*

***Commitment to a Positive Learning Environment***

The Herbert Wertheim College of Engineering values varied perspectives and lived experiences within our community and is committed to supporting the University's core values.

If you feel like your performance in class is being impacted, please contact your instructor or any of the following:

- Your academic advisor or Undergraduate Coordinator
- HWCOE Human Resources, 352-392-0904, student-support-hr@eng.ufl.edu
- Pam Dickrell, Associate Dean of Student Affairs, 352-392-2177, pld@ufl.edu