College of Engineering Syllabus

ENU-4930: Introduction to Nuclear Safeguards

1. **Catalog Description (including credit hours)** – The course provides engineering students with a brief background and overview of key topics important to nuclear materials safeguards, accountability and non-proliferation. This course will introduce the concepts behind nuclear materials controls and accountability, and discuss issues behind why nuclear safeguards continue to be a concern in our society. Students will learn the fundamentals behind predicting, measuring, and accounting for nuclear materials of interest. The course may include practical exercises at/in cooperation with Oak Ridge National Laboratory (ORNL) and a practical exercise at the University of Florida (UF). (3 credits)

2. **Pre-requisites and Co-requisites**: ENU-4001 and ENU-4605

3. **Course Objectives** -
   1. Graduates will have successful careers in Nuclear Engineering or related disciplines.
   2. Graduates will pursue advanced degrees or continuing education.
   3. Graduates will communicate effectively and work collaboratively in Nuclear Engineering or related disciplines.
   4. Graduates will use the knowledge and skills obtained in their undergraduate education to practice high ethical and professional standards in Nuclear Engineering or related disciplines

4. **Contribution of course to meeting the professional component**; 3 credits
   1. Provide students with the ability to apply advanced mathematics, computational skills, science and engineering science, including atomic and nuclear physics, to identify, formulate, analyze, and solve nuclear and radiological engineering problems.
   2. Provide students with knowledge of the fundamentals of radiation transport, interactions, and detection and with the principles required for the analysis, design, and safe operation of radiation producing devices and using equipment and systems.
   4. Provide students with the skills needed to communicate effectively, work collaboratively, and understand their professional and ethical responsibilities and the impact of engineering solutions in a societal and economic context so they can pursue successful, productive careers in nuclear and radiological engineering.

5. **Relationship of course to program outcomes**:
   A: an ability to apply knowledge of mathematics, science, and engineering.
   E: an ability to identify, formulate, and solve engineering problems.
   G: an ability to communicate effectively
   L: an ability to apply advanced mathematics, science and engineering sciences, including atomic and nuclear physics, to nuclear and radiological
systems and processes

N: an ability to work professionally in one or more of the areas of: nuclear power systems, instrumentation and measurement, radiation protection and shielding, and radiation sources and applications

6. **Instructor:** Katherin L. Goluoglu
   a. Office location – Nuclear Sciences Building Rm 232
   b. Telephone – 865-719-0521
   c. E-mail address- klgoluoglu@mse.ufl.edu
   d. Class Web site - TBA
   e. Office hours – By appointment

7. **Teaching Assistant:** None
8. **Meeting Times:** MWF, Period 2
9. **Class/laboratory schedule:** 3 50-minute classes per week, additional lab times as required
10. **Meeting Location:** FLG 260
11. **Material and Supply Fees:** none
12. **Textbooks and Software Required:**
    a. A textbook is not required; the instructor will distribute materials.
    b. *SCALE code package.* This code is export controlled and must be requested from the Radiation Safety Information Computational Center (https://rsicc.ornl.gov/Default.aspx).
13. **Recommended Reading:**
    None.
14. **Course Outline:**
    This course consists of lectures divided into four general areas:
    • Detection (4 weeks)
    • Policy and Fundamentals (4 weeks)
    • Prediction (4 weeks)
    • Practical exercises (4 weeks)
    Each section of the course will be covered by an exam or project. The exams, along with the class projects and presentations, will be used to determine the student’s final grades.
15. **Attendance and Expectations:** Attendance is required and is a partial basis for your grade. Only documented, UF-sanctioned reasons (e.g., medical emergency, religious observance) will be accepted. Cell phones and other electronic disruptions will lead to ejection from the room and being counted as absent.
16. **Grading:**
    a. Attendance: 10%
    b. Country Dossier: 20%
    c. NMC&A Exercise: 15%
    d. Practical exercise: 15%
    e. Policy test: 20%
17. **Grading Scale:** 92.0%+: A; 90.0-91.9%: A-; 87.0-89.9%: B+; 83.0-86.9%: B; 80.0-82.9%: B-; 77.0-79.9%: C+; 73.0-76.9%: C; 70.0-72.0%: C-; 67.0-69.9%: D+; 63.0-66.9%: D; 60.0-62.9%: D-; 59.9% and lower: E

A C- will not be a qualifying grade for critical tracking courses. In order to graduate, students must have an overall GPA and an upper-division GPA of 2.0 or better (C or better). Note: a C- average is equivalent to a GPA of 1.67, and therefore, it does not satisfy this graduation requirement. For more information on grades and grading policies, please visit: [https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx](https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx)

Graduate students need an overall GPA of 3.00 truncated and a 3.00 truncated GPA in their major (and in the minor, if a minor is declared) at graduation.” For more information on grades and grading policies, please visit: [http://gradcatalog.ufl.edu/content.php?catoid=4&navoid=907#grades](http://gradcatalog.ufl.edu/content.php?catoid=4&navoid=907#grades)

18. Requirements for class attendance and make-up exams, assignments, and other work are consistent with university policies that can be found at: [https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx](https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx)

19. **Honesty Policy:** All students admitted to the University of Florida have signed a statement of academic honesty committing themselves to be honest in all academic work and understanding that failure to comply with this commitment will result in disciplinary action. This statement is a reminder to uphold your obligation as a UF student and to be honest in all work submitted and exams taken in this course and all others.

Note that failure to comply with this commitment will result in disciplinary action compliant with the UF Student Honor Code Procedures. See [http://www.dso.ufl.edu/sccr/procedures/honorcode.php](http://www.dso.ufl.edu/sccr/procedures/honorcode.php)

20. **Accommodation for Students with Disabilities:** Students Requesting classroom accommodation must first register with the Dean of Students Office. That office will provide the student with documentation that he/she must provide to the course instructor when requesting accommodation.

21. **UF Counseling Services:** Resources are available on-campus for students having personal problems or lacking clear career and academic goals. The resources include:

  - UF Counseling & Wellness Center, 3190 Radio Rd, 392-1575, psychological and psychiatric services.
  - Career Resource Center, Reitz Union, 392-1601, career and job search services.
22. **Software Use:** All faculty, staff and student of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.