

Syllabus

ENU 4001 Nuclear Engineering Analysis 1, Fall 2015

4 credits – Required BS-NE Course – Dr. A. Enqvist

1. Description

Four one-hour lectures discussing continuous and discrete variable solution methods for the statistical, algebraic, differential and integral equations important in nuclear engineering. Problems involving neutron, photon, fluid and temperature distributions in configuration, time and velocity are mathematically modeled, solved and interpreted.

2. Pre-requisites and Co-requisites

MAP 2302. Co-req: CGS 2421

3. Course Objectives

1. Graduates will have successful careers in Nuclear Engineering or related disciplines.
2. Graduates will pursue advanced degrees or continuing education.

4. Contribution of course to meeting the professional component

4 credits engineering

1. Provide students with the ability to apply knowledge of mathematics, science and engineering for problem solving in engineering.
2. Provide students with the ability to identify, formulate and solve engineering problems.
3. Provide students with an ability to use the techniques, skills, and modern engineering tools, including modern computational skills and tools, necessary for nuclear and radiological engineering practice
4. Provide students with the ability to apply advanced mathematics, science, atomic and nuclear physics and engineering to nuclear and radiological systems and processes.

5. Program Outcomes Supported by Course

Outcome a: an ability to apply knowledge of mathematics, science and engineering for problem solving in engineering.

Outcome e: an ability to identify, formulate and solve engineering problems.

Outcome k: Provide students with an ability to use the techniques, skills, and modern engineering tools, including modern computational skills and tools, necessary for nuclear and radiological engineering practice

Outcome l: an ability to apply advanced mathematics, science, atomic and nuclear physics and engineering to nuclear and radiological systems and processes.

6. Instructor

Dr. Andreas Enqvist, 174 Rhines, 352 294 2177

enqvist@mse.ufl.edu

Office hours: TW 1:00-2:00 PM, via e-mail, or appointment.

Course website: on E-Learning platform (canvas).

7. Teaching Assistant: TBD

8. 9. 10. Meeting Times: Tuesday, Thursday periods 3-4, Nuclear Science Center- NSC 227

11. Material and Supply Fees

None

12. Textbooks and Software Required

- a. **Title:** Foundations in Applied Nuclear Engineering Analysis, 2nd Ed.
- b. **Author:** Glenn E. Sjoden
- c. **Publication date:** March 30, 2015
- d. **ISBN number:** 9814630934 (2nd Ed.), 9812837760 (1st Ed.)

13. Recommended Reading / Software

Software: MatLab, Mathematica, Maple, Engineering Equation Solver/TKsolver & equivalent alternatives.

References/Additional reading:

Mathematics handbook for science and engineering, Rade, Westergren, Springer, 2004

Physics handbook, Nordling; Osterman, Studentlitteratur, 2006

Advanced Engineering Mathematics, Zill, Jones, 5th Ed.

Schaum's Outline of Differential Equations, Bronson; Costa, McGraw-Hill

Introduction to Nuclear Engineering, 2nd Ed, J.R. Lamarsh, Addison-Wesley Publishing Company, Inc., 1983

14. Course Outline

- 1. Essentials of Probability as applied to nuclear engineering
- 2. Introduction to Numerical Concepts and Applications
- 3. Introduction to Complex Numbers
- 4. Ordinary Differential Equations (ODEs)
- 5. Series Solutions of ODEs
- 6. Variable Coefficient Differential Equation Solution Methods
- 7. Vector Calculus
- 8. Partial Differential Equations (PDEs)
- 9. Selected Topics and Problems Important to Nuclear Engineering as Time Permits

Tentative test dates and home work deadlines and times:

Mid-semester test 1	Sept 24 th 9.35-11.30 am
Mid-semester test 2	Nov. 5 th 9.35-11.30 am
Final Exam	14A, Dec. 14 th 7.30-9.30 am
HW1	Sept 17 th (R) 5 pm
HW2	Oct 8 th (R) 5 pm
HW3	Oct 29 th (R) 5 pm
HW4	Nov 19 th (R) 5 pm

No class dates (might be changed due to emerging travel commitments):

October 15 th	No Class – CVT conference
November 26 th	No Class - Thanksgiving

15. Attendance and Expectations:

You are expected to attend all class meetings, barring meritorious professional or University-sanctioned personal reasons. Particularly meritorious reasons are expected for any absence from exams. Whether or not your justification for your absence is acceptable (other than those that are sanctioned by the University) is at sole discretion of the Instructor. Notify the Instructor and check to see if it is acceptable as soon as you know you will be absent.

Class distractions such as cell phones are unacceptable. Students will ensure that any such devices that are brought into the classroom will be turned off. There is no tolerance for mobile phones or other electronic disruptions. Such disruptions (including texting) could lead to the student being told to leave the room for the duration of the class period, including during examination periods. Note that if a pop quiz is given after the student is asked to leave, he/she will receive zero as a grade for that pop quiz. Laptops, tablets, Blackberries, Blueberries, or any other electronic berry, etc. are not allowed during the lecture period, *except* for lectures designated to deal with numerical methods where access to computer software can enhance the learning and understanding, or as an aid in learning (note-taking etc). If a student arrives late or leaves early, he/she is expected to do so with minimum level of disruption to the class in progress. If a pop quiz is given before or after the student is in the classroom, he/she will receive zero for that pop quiz (no make-up). You will notice that there is a correlation between number of students absent in a class period and the probability of having a pop quiz!

All exams are **cumulative**, i.e., every topic that is covered prior to the exam day (including the latest class period) may be on the test. This means you should study in advance – those who wait until the last day typically do not do well in this class! Instructor will assume you already know the topics covered in the prerequisite course MAP 2302.

16. 17. Grading and scale:

Homework: 15%, Pop quizzes: 15%, two in-class mid-semester tests: 20% each, Final Exam: 30%

Grading will be on a curve. Test and assignment averages will be provided for comparison.

“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>

Homework: This course will use UF's e-learning tools. New homework assignments will be posted online. Homework turned in between the due date and the release of solutions will be worth 50% of their score had they been on time. Homework will not be accepted after solutions are released. Solutions are typically released within 1-2 weeks after the class period following the due date. There may be homework assignments for which no “late homework, half-credit” period will exist.

- 18.** Make-up exams will only be offered to those who miss the exam due to emergencies at the instructor's discretion. Health-related emergencies will require proof and may not be considered sufficient.
- 19.** Honesty Policy – UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code (<http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

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>

- 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, <http://www.counseling.ufl.edu/cwc/Default.aspx>, counseling services and mental health services.
 - Career Resource Center, Reitz Union, 392-1601, career and job search services.
 - University Police Department 392-1111
- 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.
- 23.** Students are expected to provide feedback on the quality of instruction in this course based on 10 criteria. These evaluations are conducted online at <https://evaluations.ufl.edu>. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results>.