

Nuclear Engineering Analysis 2

ENU 4003 Section NEA2

Class Periods:

Tuesdays and Thursday, Periods 3-4 (9:35 am – 11:30 am), Location: WEIL 0279

Academic Term: Fall 2025

Instructor:

Chris McDevitt, Associate Professor

174 Rhines Hall

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352-846-3785

Office Hours: Mondays (3-4 pm), Wednesdays (11:30 – 12:30 pm) and Fridays (10:30 – 11:30 am), or by appointment

Course Description

4 credit hours.

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.

Course Pre-Requisites / Co-Requisites

Pre-req:ENU 4001 with a minimum grade of C

Course Objectives

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

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	High
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 and inclusive 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	
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies	

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

Required Textbook and Software

1. Required Textbook:

- Foundations in Applied Nuclear Engineering Analysis
- Glenn E. Sjoden
- 2nd Edition
- ISBN 9814630934

2. Software:

- Matlab or Python

Recommended Materials

Additional reading

- Advanced Engineering Mathematics, Erwin Kreyszig, 10th Edition, ISBN 9780470458365
- Instructor notes largely based on material from Sjoden/Kreyszig will be posted on Canvas

Required Computer

UF student computing requirement: <https://news.it.ufl.edu/education/student-computing-requirements-for-uf/>

Course Schedule

Week 1: Ordinary Differential Equations	Chap. 5		
Week 2: Non-Homogeneous Solution Methods	Chap. 5		
Week 3: Power Series	Chap. 6	HW1	
Week 4: Solving Differential Equations with Variable Coefficients	Chap. 7		
Week 5: Vectors and Matrices	Chap. 8		
Week 6: Solving a System of Equations	Chap. 8	HW2	Exam 1
Week 7: Gram-Schmidt Orthogonalization and Fourier Series	Chap. 9		
Week 8: Applied Methods and PDEs	Chap. 10	HW3	
Week 9: Applications: Heat Transfer	Chap. 11		
Week 10: Applications: Nuclear Heat Transfer I	Chap. 12		
Week 11: Applications: Nuclear Heat Transfer II	Chap. 12	HW4	Exam 2
Week 12: Applications: Neutronics	Chap. 13		
Week 13: Data Science I	Instructor notes		
Week 14: Data Science II	Instructor notes		
Week 15: Class wrap and Review		HW5	

Attendance Policy, Class Expectations, and Make-Up Policy

Students are expected to attend each class period, though attendance is not mandatory. Electronic devices or other distractions should be avoided, with the exception of classes that deal with numerical methods. During such classes students are encouraged to follow along using suitable software on a laptop or other device.

Makeup exams will be offered for excused absences. Students should inform the instructor as far in advance as possible if he/she will be unable to take an exam at the scheduled time.

This statement is required:

Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies. Click here to read the university attendance policies:

<https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/>

Evaluation of Grades

Assignment	Percentage of Final Grade
Homework Sets	35%
Exam 1	20%
Exam 2	20%
Final Exam	25%
	100%

Homework:

Homework assignments will be posted on Canvas. There will be roughly five homework sets during the course. Homework should be submitted electronically via the Canvas website only.

Midterm exams:

Two midterm exams will be given during the semester. These exams will be administered during the normal class time. I will provide roughly one week of advanced notice.

Final exam:

The final exam will be on Monday, December 8 from 10:00 am-12:00 pm in WEIL 0279. This cumulative exam will be closed book, though one sheet (both sides) of handwritten notes will be permitted during the exam.

Grading Policy

Percent	Grade	Grade Points
92 - 100	A	4.00
88 - 91.9	A-	3.67
84 - 87.9	B+	3.33
80 - 83.9	B	3.00
76 - 79.9	B-	2.67
72 - 75.9	C+	2.33
68 - 71.9	C	2.00
64 - 67.9	C-	1.67
60 - 63.9	D+	1.33
56 - 59.9	D	1.00
52 - 55.9	D-	0.67
0 - 51.9	E	0.00

ENU 4001 is also a critical tracking course. 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 GPS 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. More information on UF grading policy may be found at:

<https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

Academic Policies & Resources

To support consistent and accessible communication of university-wide student resources, instructors must include this link to academic policies and campus resources: <https://go.ufl.edu/syllabuspolices>. Instructor-specific guidelines for courses must accommodate these policies.

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