Instructor;
Chris McDevitt, Associate Professor
174 Rhines Hall
cmcdevitt@ufl.edu
352-846-3785
Office Hours: Wednesdays (9:00 am – 10:00 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: MAP 2302; Co-req: COP 2271

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):

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Coverage*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics</td>
<td>High</td>
</tr>
<tr>
<td>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</td>
<td></td>
</tr>
</tbody>
</table>
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**
- Foundations in Applied Nuclear Engineering Analysis
  - Glenn E. Sjoden
  - 2nd Edition
  - ISBN 9814630934

**Recommended Textbook**

Software:
- One of Matlab, Python, Mathematica, or equivalent software

**Additional reading**
- Instructor notes largely based on material from Sjoden will be posted on Canvas

**Course Schedule**

- **Week 1:** Basic terms and Definitions. Probability/Statistics  
  - Chaps. 1 & 2
- **Week 2:** Numerical Concepts  
  - Chap. 3
- **Week 3:** Complex Numbers  
  - Chap. 4
- **Week 4:** Ordinary Differential Equations  
  - Chap. 5  
  - HW1
- **Week 5:** Non-Homogeneous Solution Methods  
  - Chap. 5
- **Week 6:** Power Series  
  - Chap. 6  
  - Exam 1
- **Week 7:** Solving Differential Equations with Variable Coefficients  
  - Chap. 7  
  - HW2
- **Week 8:** Vectors and Matrices  
  - Chap. 8
- **Week 9:** Solving a System of Equations  
  - Chap. 8
- **Week 10:** Gram-Schmidt Orthogonalization and Fourier Series  
  - Chap. 9  
  - HW3
- **Week 11:** Applied Methods and PDEs  
  - Chap. 10  
  - Exam 2
- **Week 12:** Applications: Heat Transfer  
  - Chap. 11
- **Week 13:** Applications: Nuclear Heat Transfer  
  - Chap. 12
- **Week 14:** Applications: Neutronics (time permitting)  
  - Chap. 13  
  - HW4
- **Week 15:** Class wrap and Review

**Online Course Recording**

Our class sessions may be audio visually recorded for students in the class to refer back and for enrolled students who are unable to attend live. Students who participate with their camera engaged or utilize a profile image are agreeing to have their video or image recorded. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise, students who un-mute during class and participate orally are agreeing to have their voices recorded. If you are not willing to consent to have your voice recorded during class, you will need to keep your mute button activated and communicate exclusively using the "chat" feature, which allows students to type questions and comments live. The chat will not be recorded or shared. As in all courses, unauthorized recording and unauthorized sharing of recorded materials is prohibited.

**Attendance Policy, Class Expectations, and Make-Up Policy**
Students are expected to attend each class period. Periods that may be missed should be brought to the attention of the instructor as far in advance of the class period as possible. In the event of an unexcused absence, it is the student's responsibility to obtain and review the material covered during that class period. If a student arrives late or leaves early, he/she is expected to do so with a minimum level of disruption to the class in progress. 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. Excused absences must be consistent with university policies in the undergraduate catalog (https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx) and require appropriate documentation.

**Evaluation of Grades**

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Percentage of Final Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework Sets</td>
<td>30%</td>
</tr>
<tr>
<td>Exam 1</td>
<td>20%</td>
</tr>
<tr>
<td>Exam 2</td>
<td>20%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>30%</td>
</tr>
<tr>
<td></td>
<td>100%</td>
</tr>
</tbody>
</table>

*Homework:*  
Homework assignments will be posted on Canvas. There will be about 4-5 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 Thursday, December 12th from 7:30am-9:30am. This cumulative exam will be closed book, though one sheet (both sides) of handwritten notes will be permitted during the exam.

**Grading Policy**  
The following is given as an example only.

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

*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](https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx)

**Students Requiring Accommodations**
Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, https://www.dso.ufl.edu/drc) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

Course Evaluation
Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at https://gatorevals.aa.ufl.edu/students/. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via https://uf.bluera.com/ufl/. Summaries of course evaluation results are available to students at https://gatorevals.aa.ufl.edu/public-results/.

In-Class Recording
Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

Publication without permission of the instructor is prohibited. To “publish” means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

University 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 (https://www.dso.ufl.edu/scrr/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.

Commitment to a Safe and Inclusive Learning Environment
The Herbert Wertheim College of Engineering values broad diversity within our community and is committed to individual and group empowerment, inclusion, and the elimination of discrimination. It is expected that every person in this class will treat one another with dignity and respect regardless of gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture.
If you feel like your performance in class is being impacted by discrimination or harassment of any kind, please contact your instructor or any of the following:

- Your academic advisor or Graduate Program Coordinator
- Jennifer Nappo, Director of Human Resources, 352-392-0904, jennnacc@ufl.edu
- Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, taylor@eng.ufl.edu
- Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, nishida@eng.ufl.edu

**Software Use**

All faculty, staff, and students 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.

**Student Privacy**

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see: https://registrar.ufl.edu/ferpa.html

**Campus Resources:**

**Health and Wellness**

<table>
<thead>
<tr>
<th>U Matter, We Care:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact <a href="mailto:umatter@ufl.edu">umatter@ufl.edu</a> so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.</td>
</tr>
</tbody>
</table>

| Counseling and Wellness Center: | http://www.counseling.ufl.edu/cwc and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies. |

<table>
<thead>
<tr>
<th>Sexual Discrimination, Harassment, Assault, or Violence</th>
</tr>
</thead>
<tbody>
<tr>
<td>If you or a friend has been subjected to sexual discrimination, sexual harassment, sexual assault, or violence contact the Office of Title IX Compliance, located at Yon Hall Room 427, 1908 Stadium Road, (352) 273-1094, <a href="mailto:title-ix@ufl.edu">title-ix@ufl.edu</a></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sexual Assault Recovery Services (SARS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student Health Care Center, 392-1161.</td>
</tr>
</tbody>
</table>

| University Police Department | at 392-1111 (or 9-1-1 for emergencies), or http://www.police.ufl.edu/. |

**Academic Resources**

<table>
<thead>
<tr>
<th>E-learning technical support</th>
<th>352-392-4357 (select option 2) or e-mail to <a href="mailto:Learning-support@ufl.edu">Learning-support@ufl.edu</a>.</th>
</tr>
</thead>
<tbody>
<tr>
<td><a href="https://lass.at.ufl.edu/help.shtml">https://lass.at.ufl.edu/help.shtml</a>.</td>
<td></td>
</tr>
</tbody>
</table>


| Library Support | http://cms.uflib.ufl.edu/ask. Various ways to receive assistance with respect to using the libraries or finding resources. |

**Nuclear Engineering Analysis 1, ENU 4001**

*Chris McDevitt, Fall 2021*
Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring. [https://teachingcenter.ufl.edu/](https://teachingcenter.ufl.edu/).

Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers. [https://writing.ufl.edu/writing-studio/](https://writing.ufl.edu/writing-studio/).
