Catalog Description: Development and application of analytical and numerical methods with applications to problems in the NE/RHP field. Major topics will include solution of ODEs and systems of ODEs, root finding techniques and numerical integration and differentiation. Major applications will include solution of the Bateman Equations and solution of the diffusion equation.

Prerequisites: MTH 254
Co-requisites: MTH 256
Number of Credits: 3 hours of lecture per week, offered spring quarter each year.

Textbook and other required course materials:
Required: Instructor’s notes
Textbook – none required


Contact: Todd Keller, Reactor Administrator, 541-737-7046, kellerst@engr.orst.edu

Student Learning Outcomes and Mapping to Program Outcomes:
This course is designed to introduce students to numerical and analytical solution techniques for problems found in the NE/RHP field. Students will demonstrate the ability to:

2. Solve systems of ODE’s using analytical techniques (ABET Outcomes A, E, K, L, M).
5. Implement numerical differentiation and integration algorithms (ABET Outcomes A, B, E, K, L, M).
8. Understand the accuracy of various numerical techniques (ABET Outcomes A, B, K, L, M).
Topics:

1. Interpolation methods, polynomial curve fit, spline curve fit.
2. Use of the integrating factor, solution of homogeneous and inhomogeneous ODE’s.
4. Introduction to series techniques for solution of ODE’s. The Bessel Function.
5. Root finding techniques.

Computer Usage:

1. Composition of computer codes to implement algorithms described in the course.
2. Use of Matlab to evaluate mathematical expressions and implement algorithms.
3. Use of word processing and presentation software.

Grading:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Homework</td>
<td>60%</td>
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<tr>
<td>Midterm</td>
<td>15%</td>
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<tr>
<td>Final Exam or final project</td>
<td>25%</td>
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Students with Disabilities:

Accommodations for students with disabilities are determined and approved by Disability Access Services (DAS). If you, as a student, believe you are eligible for accommodations but have not obtained approval please contact DAS immediately at 541-737-4098 or at http://ds.oregonstate.edu. DAS notifies students and faculty members of approved academic accommodations and coordinates implementation of those accommodations. While not required, students and faculty members are encouraged to discuss details of the implementation of individual accommodations.

Course Policies:

1) Late coursework: Assignments are due at the beginning of class on the day the assignment is due. One minute to one week late: 75% maximum credit. More than one week late: no credit (late assignments may be submitted for partial or full credit only by prior arrangement with the instructor).
2) Office hours M, T, W, Th, F 0800 – 1700, EXCEPT no office hours will be held the day an assignment is due. Appointment recommended.
3) Each student must complete and turn in their own homework assignment unless the assignment is specifically labeled as a “group” assignment. Student collaboration is encouraged, but each student must prepare and submit his or her assignment.
4) Please be aware of the OSU Statement of Expectations for Student Conduct: http://studentlife.oregonstate.edu/studentconduct/offenses-0