MTH 581, Applied Ordinary Differential Equations

Catalog Description: Linear and nonlinear systems of ordinary differential equations, elementary stability theory, higher order equations, boundary value problems, series solution of ordinary differential equations.

Credits: 3 (This course combines approximately 90 hours of instruction and assignments.)

Terms offered: F

Prerequisites: Enforced: MTH 256 and either (MTH 253 and MTH 341) or MTH 306 with C- or better.

Meets: Three 50 minute lectures weekly.

Course Content: Linear and nonlinear systems of ordinary differential equations, elementary stability theory, higher order equations, boundary value problems, power series solution of ordinary differential equations.

Learning Resources: The required course text is Elementary Differential Equations and Boundary Value Problems, by Boyce and DiPrima (9th edition, Wiley).

Math 581 Student Learning Outcomes: A successful student in MTH 581 will be able to:
1. Derive and represent solutions of linear second order differential equations as power series.
2. Describe the general solution of first order linear systems of differential equations.
3. Represent higher-order equations as a first order system of differential equations.
4. Construct the general solution of systems of differential equations with constant coefficients by using techniques from linear algebra.
5. Evaluate the stability of solutions of nonlinear systems of differential equations and relate the stability at a critical point to that of the corresponding linear approximation.
**Evaluation of Student Learning:** Your grade and measurement of your progress on the course outcomes will be based on written homework (assigned in class and collected approximately weekly) along with written midterm and final exam. Additional in-class activities will include problem sessions with blackboard presentations. Student learning will be evaluated using the differentiated learning outcomes of Math 481 and Math 581.

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<tr>
<th>Component</th>
<th>Weight</th>
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<tbody>
<tr>
<td>Homework</td>
<td>10%</td>
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<tr>
<td>Midterm Exam I</td>
<td>25%</td>
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<tr>
<td>Midterm Exam II</td>
<td>25%</td>
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<tr>
<td>Final Exam</td>
<td>40%</td>
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You may collaborate on homework but you should write up your own solutions in your own words. If you use external sources, you should cite them. The midterms and final exams will be closed book.

**Students With Disabilities:** Accommodations are collaborative efforts between students, faculty and Disability Access Services (DAS). Students with accommodations approved through DAS are responsible for contacting the faculty member in charge of the course prior to or during the first week of the term to discuss accommodations. Students who believe they are eligible for accommodations but who have not yet obtained approval through DAS should contact DAS immediately at 737-4098. Consult [http://ds.oregonstate.edu/home](http://ds.oregonstate.edu/home).

**Academic Honesty and Student Conduct:** Students are expected to be familiar with the Homework and Exam policies stated in this syllabus, as well as Oregon State University's Student Conduct Code. [http://oregonstate.edu/studentconduct/code/index.php](http://oregonstate.edu/studentconduct/code/index.php).