Math 331.04: Ordinary Differential Equations - Spring 2017
TuTh 8:30AM - 9:45AM, Goessmann Lab Addtn rm 151

Instructor:

- Professor: Qian-Yong Chen
  Office: LGRT 1442; Email: qchen@math.umass.edu (preferred); Tel: 545-9611
  Office Hours: TuTh 10 AM - 11:30 AM or by appointment
  Course homepage: http://www.math.umass.edu/~qchen/331_04.html

TAs:

Prerequisite: MATH 132, or 136; co-requisite: MATH 233; Math 235 or equivalent is highly recommended.


Grading: Homework will be assigned weekly through WebWork There will be one midterm and a final exam. Quizzes will also be given in class. The final grade will be calculated as follows.

- Quizzes: 10%
- WebWork: 30%
- Midterm: 30%
- Final Exam: 30%

Grading scale:

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<th>Grade</th>
<th>A</th>
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<th>B+</th>
<th>B</th>
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<th>C+</th>
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Drop, Withdrawal, and Incomplete:
The last day to drop/add with no record is Monday, February 6. The last day to drop with a W is Wednesday, March 8.

An incomplete is possible only if all of the following apply: (1) you have a compelling personal reason, e.g., serious illness; (2) your work so far would receive a passing grade; and (3) there is a good chance you will complete the course with a passing grade within the allotted time. Thus, expecting to fail the class is no reason to ask for an incomplete.

Course Description: Introduction to ordinary differential equations. First and second order linear differential equations, systems of linear differential equations, Laplace transform, numerical methods, applications.

Tentative topics and schedule:

- Week 1: Quick review of Calculus & How do ODEs arise, modeling, examples of ODEs from applications: Ch. 1.1, 1.2
- Week 2 & 3: Solving ODEs, linear 1st order ODEs, discussion of existence and uniqueness: Ch. 1.3, 1.4, 1.5, 1.7
- Week 3 & 4: 2nd order linear ODE, characteristic equation: Ch. 2.1, 2.2, 2.5
Week 5: Harmonic oscillator: Ch. 2.4, 2.6

Week 6: Inhomogeneous linear ODEs, undetermined coefficients, variation of constants, : Ch. 2.7, 2.10

Week 7: Forced oscillation, electric circuits, resonance: Ch. 2.8, 2.9

Week 8: Higher order ODEs, elasticity examples: Ch. 3.1, 3.2, 3.3

Week 9 & 10: Laplace transforms: Ch. 6.1, 6.2, 6.3

Week 10 & 11: Laplace transforms; Reduction of order, systems of ODEs: : Ch. 6.4, 6.5; Ch. 4.1, 4.2

Week 12: Linear 2-dim systems: Ch. 4.3, 4.4

Week 13: Non-linear 2-dim systems, predator-prey models, attractors: 4.5, 4.6