Math 426: Introduction to Applied Mathematics and Modeling
Spring 2013

INSTRUCTOR: Prof. Julia Arciero
Email: jarciero@math.iupui.edu
Office: LD 270D
Phone: (317) 274-6998
Office hours: Monday: 3:30 – 4:30 pm
Wednesday: 3 – 4 pm
or by appointment

LECTURE: Monday and Wednesday 4:30-5:45 pm, SL 109


COURSE WEBSITE: www.math.iupui.edu/~jarciero/math426_Spring2013.html

**NOTE: Click on the “Course Homepage” link to access this page from Oncourse**

MAIN TOPICS:
This course is an introduction to applied mathematical modeling. You will learn about all stages of the modeling process, including model development, model analysis, parameter fitting, and model verification. Applications to biology, physics, engineering, economics, and other disciplines will be introduced. Portions of Chapters 4-10 of the textbook will be covered. Main topics will include:

- Ordinary differential equation models
  - Reaction kinetics
  - Phase plane analysis
  - Bifurcation analysis
  - Limit cycles and oscillations

- Partial differential equation models
  - Reaction-diffusion
  - Traveling waves

- Parameter estimation for models
HOMEWORK:
Homework will be collected every Wednesday. All assignments and due dates will be announced in class and posted on the course website. No late homework will be accepted. If you have a serious conflict that may prevent you from submitting an assignment on time, please notify me as far in advance as possible. While you are encouraged to discuss homework problems with me, classmates, or tutors, solutions to the homework problems must be worked out and submitted individually. Copying solutions from other students will be considered cheating and handled accordingly. All homework assignments will be graded. I will drop the lowest two homework scores before computing the final homework grade.

Please make use of my office hours (or make an appointment with me) if you have any questions or are having difficulty with any of the material. I am always happy to discuss the course material and homework problems with you, and I greatly welcome feedback on the course.

CALCULATOR POLICY: No calculators or other forms of technology can be used on in-class, closed-book assessments (tests, final exam).

TERM PROJECT:
Term projects will be assigned in early February and will be due Wednesday, April 24. You will design a mathematical model for a biological, chemical, mechanical, or economic system, fit the model using real or simulated data, and write a project report. Examples of projects will be provided. Additional details are forthcoming.

EXAMS AND GRADING:
Midterm exam: There will be one midterm examination given in class on Wednesday, March 6. Final exam: The cumulative final exam will be on Wednesday, May 1 from 3:30-5:30 p.m.

There will be NO make-up exams, so please tell me the first week of class if you have a problem with either of these exam dates.

The overall grading policy is as follows:

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<thead>
<tr>
<th>Component</th>
<th>Weight</th>
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<tbody>
<tr>
<td>Homework</td>
<td>25 %</td>
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<tr>
<td>Term Project</td>
<td>25 %</td>
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<tr>
<td>Midterm exam</td>
<td>25 %</td>
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<tr>
<td>Final exam</td>
<td>25 %</td>
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Additional Course Information

ACCOMMODATIONS: Students needing accommodations because of a disability will need to register with Adaptive Educational Services (AES) and complete the appropriate forms issued by AES before accommodations will be given. The AES office is located in Taylor Hall, UC 100. You can also reach the office by calling 274-3241. Visit http://aes.iupui.edu/ for more information.

DISHONESTY/STUDENT MISCONDUCT: Cheating will result in a minimum penalty of receiving a grade of F in the course. The IUPUI Department of Mathematical Sciences expects all students to adhere to the regulations put forth in the "IUPUI Code of Student Rights, Responsibilities, and Conduct" concerning academic misconduct or personal misconduct. Procedures for imposing academic and disciplinary sanctions are outlined at: http://www.iupui.edu/code/

CAMPUS-WIDE POLICIES GOVERNING THE CONDUCT OF COURSES AT IUPUI: These can be found at http://registrar.iupui.edu/course_policies.html, with links to specific policies in the general areas of attendance, academic policy, conduct and related policies.

ADMINISTRATIVE WITHDRAWAL: A basic requirement of this course is that you will participate in all class meetings and conscientiously complete all required course activities and/or assignments. Keep in touch with me if you are unable to attend, participate, or complete an assignment on time. If you miss more than half of the required activities within the first 25% of the course without contacting me, you may be administratively withdrawn from this course. Administrative withdrawal may have academic, financial, and financial aid implications. Administrative withdrawal will take place after the full refund period, and if you are administratively withdrawn from the course you will not be eligible for a tuition refund. If you have questions about the administrative withdrawal policy at any point during the semester, please contact me.

INCOMPLETES: Grades of Incomplete will only be given in accordance with the university policy available at http://www.registrar.iupui.edu/incomp.html. Specifically, students must be passing at the 3/4 mark of the semester to qualify for assigning an incomplete. The instructor must agree that an incomplete is appropriate and it must be approved by the Associate Chair of the Department of Mathematical Sciences.

Withdrawals: If you decide to withdraw from the course, be sure to process all paperwork by the appropriate deadlines outlined in the following table:

<table>
<thead>
<tr>
<th>Times</th>
<th>Required Signatures</th>
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<tr>
<td>First Week</td>
<td>None</td>
</tr>
<tr>
<td>After First Week</td>
<td>Advisor</td>
</tr>
<tr>
<td>1/2 mark of Semester</td>
<td>Advisor and Instructor</td>
</tr>
<tr>
<td>3/4 mark of Semester</td>
<td>Associate Chair, LD 270*</td>
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Official details can be found at: http://registrar.iupui.edu/accal.html
* After the 3/4 mark of the semester, course instructors cannot sign a drop slip. The student must see the Associate Chair of the Department of Mathematical Sciences. The School of Science Dean’s Office will not endorse a withdrawal after the 3/4 mark of the semester for students unless an extremely serious and documentable excuse is established.