

**MATH 4970: Mathematics Capstone: An Invitation to Applied Mathematics**  
**MWF 3:00–3:50 P.M., Strickland 213.**

Carmen Chicone  
216 Math. Sci. Bldg.  
Current Office Hours: Mon. 4:00 P.M. and by appointment  
Phone: 882-6331  
E-Mail: carmen@math.missouri.edu or ChiconeC@missouri.edu  
Course Web Page: <http://www.math.missouri.edu/~carmen/Classes/>

**SYLLABUS**

There is no textbook for this class. Notes will be provided for most of the topics that we will cover. We will proceed simultaneously on three tracks: a lecture course on various topics in applied mathematics, student presentations of solutions to assigned homework problems, and student presentations of their course projects.

Homework problems are posted on the course web page. This list will be modified as the semester progresses. Your assignment is to solve as many of the homework problems as possible. You should be ready to present your solutions in class and also you should carefully write out your solutions (in complete sentences) to hand in. The topics for homework problems range over the entire undergraduate mathematics curriculum. They are intended to provide a mechanism for review as well as a mathematical challenges. Doing mathematics is the best way to learn mathematics!

The topic for a course project must be approved by the professor, but you may choose from the entire subject of mathematics and its applications. Presentations of course projects will be made in class during the last few weeks of the semester.

The lecture part of the course will cover (as time permits) the following topics:

- Celestial Mechanics, Two-Body Problem, Satellites in Circular Orbits, Transfer Orbits
- Differential Equation Model of Environmental Pollutant, Reaction-Diffusion Equations, Grey-Scott Model
- Equations of Fluid Dynamics, Reynolds' Number and Scale Modeling, Flow In a Pipe, Potential Flow, Water Waves, Formation of Cyclones

The theme is applied mathematics.

**Grades:** Your grade will be based on homework and class presentations. Some homework assignments will be take-home exams.

**Homework Rules:** You are allowed to work with a classmate on homework, but the work you hand in should be written in your own words. Part of your education is to learn to write and to speak mathematics. Class presentations will be part of the process of learning to speak; homework will also be an opportunity to learn to write. Because of the special nature of this class, I will insist on writing solutions to homework problems in complete sentences.

**Feedback:** I sincerely want every member of the class to learn as much as possible. I welcome constructive criticism of the way the course is conducted. Your evaluations of the course will be requested near the end of the semester.

**If you need accommodations because of a disability,** if you have emergency medical information to share with me, or if you need special arrangements in case the building must be evacuated, please inform me immediately. Please see me privately after class, or at my office. To request academic accommodations (for example, a note taker), students must also register with Disability Services (<http://web.missouri.edu/accesscm>), AO38 Brady Commons, 882-4696 or 882-8054 TTY. It is the campus office responsible for reviewing documentation provided by students requesting academic accommodations, and for accommodations planning in cooperation with students and instructors, as needed and consistent with course requirements. Another resource, MU's Adaptive Computing Technology Center (<http://iatservices.missouri.edu/adaptive>), 884-2828, is available to provide computing assistance to students with disabilities. For more information about the rights of people with disabilities, please see [ada.missouri.edu](http://ada.missouri.edu) or call 884-7278.

**Academic Honesty:** Academic honesty is fundamental to the activities and principles of a University. Any effort to gain an advantage not given to all students is dishonest whether or not the effort is successful. When in doubt about plagiarism or collaboration, consult the course instructor. The academic community regards academic dishonesty as an extremely serious matter, with serious consequences that range from probation to expulsion.

If at any time you have questions about this policy, please ask.

Academic honesty is fundamental to the activities and principles of a University. Any effort to gain an advantage not given to all students is dishonest whether or not the effort is successful. When in doubt about plagiarism or collaboration, consult the course instructor. The academic community regards academic dishonesty as an extremely serious matter, with serious consequences that range from probation to expulsion.

**Complaints:** If you have communication (or other problems) with your instructor, you can report them to Professor Konstantin Makarov (Director of Undergraduate Studies) either by phone (882-4898) or by e-mail ([makarov@math.missouri.edu](mailto:makarov@math.missouri.edu)).