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# Mathematical Modelling : Industrial Mathematics

Math 396 Spring 2015

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Fowler 113 T 1:30- 2:55pm

<http://faculty.oxy.edu/ron/math/396/15/>

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**INSTRUCTOR** Ron Buckmire ~ Fowler 313 ~ x2536 ~ [ron@oxy.edu](mailto:ron@oxy.edu) ~ @MadProfessah

**OFFICE HOURS** I am almost always in my office (Fowler 313) until at least 5pm on days that I am teaching.

My official office hours for Spring 2015 are **MWRF 11am-12pm and MWF 4-5pm**.

You can also make individual appointments at <http://ronbuckmire.youcanbook.me>

**TEXTBOOK** There is no required textbook for this course.

**WEBSITE** <http://faculty.oxy.edu/ron/math/396/15/>

**FORMAT OF THE CLASS** This is not a typical mathematics class! Instead, the format of the class is what is known in some circles as a clinic. What this means is that the focus of the class is providing students with opportunities to learn by doing. In this class I want students to gain experience in how mathematics is used to solve real-world problems in business, industry or government (B.I.G.) and to develop and improve their skills for working in such environments in the future.

**STRUCTURE OF THE CLASS** Students will work together in collaborative groups to attempt to solve a real-world problem (of their choice) which has been provided by various clients from business, industry or government. These problems are not well-posed and do not have clear solutions. Part of the task will be understanding the statement of the problem and converting it into a well-posed mathematical problem. There may be other frontiers of knowledge (biology, physics, economics, ecology, computer programming ) that have to be addressed in order to make reasonable progress on your selected problem.

These problems will involve doing research to learn what parameters and mathematical ideas can be used to solve the problem and then students will also need to learn the specifics of the mathematics and apply them correctly in order to present a solution to the client.

Almost certainly you will be spending far more time outside of class working on the problems than is scheduled for the class. Please take careful records of time spent on the following activities associated with this class (Team meetings; researching the background of your particular problem (literature, web, library, mathematics); Computer programming; Preparing progress reports; Preparing the final (written and oral) presentations).

**GOALS OF THE CLASS** The goals of this class are

- provide students with the experience of using mathematics to solve an actual real world problem of their choice by
  - developing, testing and implementing a mathematical model of their own devising
  - performing calculations and evaluating their results for accuracy and appropriateness
- assist in the preparation of students for a potential career in industrial or applied mathematics by
  - exposure to non-academic stakeholders in business, industry or government;
  - developing collaboration skills by working in small teams towards a common goal
  - improving communication skills (especially of mathematical/technical content)

**GRADES** Your course grade will be composed of the following:

- Group and Individual evaluations **15%**
- Participation (Team meetings, class meetings, time sheets ) **15%**
- Progress Reports (Feb. 3, Feb. 17, Mar. 3, Mar. 24, Apr. 7 and Apr. 21) **20%**
- Final Written Presentation **25%**
- Final Oral Presentation (videotaped) **25%**

The final written presentation will not be due until Tuesday May 5. Final presentations will occur between Tuesday April 21 and Tuesday April 28. These will be videotaped and students will be expected to dress in professional attire whenever interacting with non-academic stakeholders.

**COURSE POLICIES Attendance at all weekly class sessions will be mandatory** (There's only 14 of these and this is where you will be able to work with professor and the rest of the class in a larger group on your selected problem.)

**COLLEGE POLICIES** Here are some official policies of Occidental College which you should be aware of

**Disabilities:** Accommodation of disability-related needs is available on request. Students with documented disabilities who are registered with Disability Services are required to present their accommodation verification card to the instructor at the beginning of each semester or as soon as possible thereafter. Students who experience significant physical or mental impairments can contact Disability Services at (323-259-2969) to learn about available services and support.

**Honest Academic Work:** Shared commitment to ethical principles is essential to the educational purposes and fairness of the academic enterprise. Occidental College assumes that students and faculty will embrace a high ethical standard for academic work. Fundamental to academic ethics is a spirit of honor. A spirit of honor thrives when students challenge each other to attain the highest levels of scholarship, civility, and responsibility. For more information, see <http://www.oxy.edu/student-handbook/academic-ethics/academic-ethics>

**Classroom Conduct:** The goals of this course can only be accomplished in a setting of mutual respect. Although the study of mathematics rarely lends itself to too much controversy, we must still provide a safe environment that is conducive to learning. All are welcomed and encouraged to actively participate in the learning of differential equations, regardless of gender, race, nationality, native language, sexual orientation, gender identity, political ideology, and especially personal mathematical history. Any student who feels she or he is experiencing an environment that is not conducive to learning should speak to me immediately.

**Electronic Devices:** Please remember that common courtesy dictates turning off all electronic devices and cell phones (or place in silent mode) before coming to class; these devices can be a distraction for other students (and me!) in the class and thus should not be in use during class time unless I give you explicit permission to do so.