Math 336: Introduction to Mathematical Modeling
11am-12.15pm TR, Classroom GMCS307, Spring 2015

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Office Hours: 9-11am TR or by appointment

Text: *Mathematical Modeling*, 4th ed., by Mark M. Meerschaert, Academic Press, 2013, 365pp, ISBN: 978-0-12-386912-8, and handouts.

Prerequisites: Math 254 (Introduction to Linear Algebra)

Topics covered in this course: The first part will be from the textbook: Chapters 1, 2, 3, 7, 8, and 9. These include optimization models, probabilistic models, statistical models, and MATLAB and MAPLE programs. The second part will be on mathematical models for big data. The third part will be about simple climate models and dimension analysis.

Computing: Mathematics and statistics software, such as Matlab, Maple, and R, will be used in this course. Students should learn one of the programs from our class and online tutorial if s/he does not know any computer programs.

Grading Policy:	The final grades for this class will be determined as follows:	
	Homework assignments (3 times)	45%
	Literature review and report writing (2 times)	30%
	Final project	25%
	Total--------------------------------------	100%

Class Attendance: The students are required to attend all the classes. The class attendance will be taken randomly in lectures. Those who attend every lecture will receive a 2% bonus.

Note-taking: Each student should have a plan to build a portfolio/folder for this class. Class notes are an important part of the folder. Each student should take class note. A detailed and neat Math 336 folder will earn 1% bonus. The instructor will check the Math 336 folder toward the end of the semester.

Learning outcome: Students are expected to master the basic concept of mathematical modeling in science and engineering. Students will be able to develop and understand introductory mathematical models. They will also be able to solve the models, either analytically or numerically, and interpret the modeling results using statistical methods. They will master basic principles of model error estimation, model validation by observed data, and model revision for improvement. Students will be able to write a mathematical modeling report for a specific problem from engineering and science, with high quality tables, figures and visualization movies.