Math 336: Introduction to Mathematical Modeling
11am-12.15pm TR, Classroom GMCS307, Spring 2016

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Office Hours: 9-11am TR or by appointment

Text: *Lecture notes will be distributed in the class. The major reference is "Mathematical Modeling"*, 4th ed., by Mark M. Meerschaert, Academic Press, 2013, 365pp, ISBN: 978-0-12-386912-8. *Students do not have to buy this book.*

Prerequisites: Math 254: Introduction to Linear Algebra

Topics covered in this course: Linear regression models, linear algebra models, probability models, calculus models, differential equation models, stochastic models, dimensional analysis, big data models, applications, and R programs.

Computing: R will be the main computing program used for this course and will be taught in class from beginning. R is free and can be downloaded and installed easily for either PC or Mac. Computer programming experience is not required although helpful.

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.