Fall 2020, Math 336: Introduction to Mathematical Modeling

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Text: *"Introduction to Modern Mathematical Modeling with R" Lecture notes authored by Samuel Shen. The lecture notes will be posted on Blackboard, available to students for free.*

Prerequisites: Math 254: Introduction to Linear Algebra

Topics covered in this course: Dimensional analysis, R programming, linear regression models, linear algebra models, probability models, calculus models, differential equation models, stochastic models, big data models, data visualization models, machine learning, and real-world applications (e.g., global climate change).

Computing: Students are required to bring a laptop computer to each class. R will be the computer 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. To download and install R and RStudio, follow a video instruction by YouTube or a text instruction by UCLA, or search the Internet for "R and RStudio installation" instructions on your own. Computer programming experience is not required for this course, and learning R is part of this course.

Grading Policy:	The final grades for this class will be determined as follows:	
	Homework assignments (3 times)	30%
	Midterm exam (10:00-10:50AM, October 21/Wed)	20%
	[Due to COVID, the midterm will be a take home exam. The BB submission deadline is 11.59pm of next day, Oct 22/Thur]	
	Consulting project report (due Nov 30/Mon)	15%
	Class attendance and discussion	5%
	Final exam (10:30AM-12:30PM, Dec 11/Fri)	30%
	[The final is also a take home, and the BB submission deadline is 11.59pm of next day, Dec 12/Sat. The final covers all the materials taught in the entire semester.]	
	Total------------------------------------	100%

Class Attendance and Discussion: The students are required to attend all classes and to submit questions to BB for classroom discussion. The class attendance will be taken randomly.

Note-taking: Each student should build a paper or computer portfolio/folder for this class. Class notes are an important part of the folder. Each student should take class note either on paper or computer.

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.

Use of Blackboard

Blackboard will be used to disseminate and collect information related to the course. Student support for Blackboard is provided by the Library Computing Hub, located on the 2nd floor of Love Library. They can be reached at 619-594-3189 or hub@mail.sdsu.edu

Students with Disabilities

If you are a student with a disability and believe you will need accommodations for this class, it is your responsibility to contact Student Disability Services at (619) 594-6473. You can also learn more about the services provided by visiting the Student Disability Services website.
To avoid any delay in the receipt of your accommodations, you should contact Student Disability Services as soon as possible. Please note that accommodations are not retroactive, and that accommodations based upon disability cannot be provided until you have presented your instructor with an accommodation letter from Student Disability Services. Your cooperation is appreciated.

Student Services:

A complete list of all academic support services is available on the Academic Success section of the SDSU Student Affairs website. For help with improving your writing ability, the staff at the SDSU Writing Center is available in person and online.
Counseling and Psychological Services offers confidential counseling services by licensed psychologists, counselors, and social workers. More info can be found at their website or by contacting (619) 594-5220. You can also Live Chat with a counselor http://go.sdsu.edu/student_affairs/cps/therapist-consultation.aspx between 4:00pm and 10:00pm, or call San Diego Access and Crisis 24-hour Hotline at (888) 724-7240.

Academic Honesty

The University adheres to a strict policy regarding cheating and plagiarism. These activities will not be tolerated in this class. Become familiar with the policy and what constitutes plagiarism (http://studentaffairs.sdsu.edu/srr/cheating-plagiarism.html). Any cheating or plagiarism will result in failing this class and a disciplinary review by the University. These actions may lead to probation, suspension, or expulsion. Examples of Plagiarism include but are not limited to:

- Using sources verbatim or paraphrasing without giving proper attribution (this can include phrases, sentences, paragraphs and/or pages of work)
- Copying and pasting work from an online or offline source directly and calling it your own
- Using information you find from an online or offline source without giving the author credit
- Replacing words or phrases from another source and inserting your own words or phrases
- Submitting a piece of work you did for one class to another class