M310T (SSC 318): Introduction to Statistical and Scientific Computation, Fall 2009

Unique # 57565, 57570, 57575 (59960, 59965, 59970)

Course Syllabus

This is an introductory course to quantitative analysis using fundamental concepts in statistics and scientific computation. Main theoretical topics covered include: probability, distributions and sampling, interpolation of functions, numerical integration, iterative methods for root-finding, system of linear equations, and Monte Carlo methods. The use of MATLAB to implement some fundamental algorithms will also be covered.

Prerequisite. In general, there is no prerequisite for this class. However, some knowledge in calculus and probability will be very helpful.

Class Time and Location. The class will meet T TH 9:30 AM - 11:00 AM @ RAS 213.

Problem Session. The problem sections will meet @ RLM 7.122 M: 2:00 - 3:00 PM, W 10:00 - 11:00 AM, or W 1:00 - 2:00 PM depending on which session you are registered in.

Instructor. Kui Ren
        Office: RLM 10.170
        Phone: 512-471-3152
        Email: ren@math.utexas.edu
        Office Hours: T TH 11:00AM-12:30PM + Appointments.

Teaching Assistant. Daniel Blazevski
        Office: RLM 12.132
        Phone: 512-475-8687
        Email: dblazevski@math.utexas.edu
        Office Hours: Tuesday 2:00-3:00PM.

Homework, Class Project, and Exams. There will be nine homework sets, two in-class exams and a final exam. Note that, in principle, no late homework will be accepted and no makeup exam will be arranged. Each of you will be assigned a small research project at the beginning of November. The project has to be completed by the end of the semester and will be counted toward your final grade.

Grading Policy. The final grade will be weighted roughly as follows:

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Homework 18%, Project 22%, Exam I 15%, Exam II 15%, Final Exam 30%.
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The letter grades are distributed as follows:

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90% - 100% : Grade A
80% - 89%  : Grade B
70% - 79%  : Grade C
60% - 69%  : Grade D
0%  - 59%  : Grade F
```

Course Webpage. All the homeworks will be posted on the university teaching tool, the `blackboard` system:

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https://courses.utexas.edu/webapps/portal/frameset.jsp
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Textbooks.

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Numerical Computing with MATLAB (required)
Cleve Moler
Society for Industrial and Applied Mathematics

Elementary Statistics, 10th edition (recommended)
Mario F. Triola,
Addison-Wesley
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Computing Resources. The mathematics undergraduate computer lab in RLM 7.122 is open to all students enrolled in a math course. The lab is open whenever the RLM building is open. You will need an account to use the lab. Bring your EID with you when you visit the lab to sign up for an account.

Important Dates.

- 08/31/2009, Last day of official add/drop period

- 09/23/2009, Last day to drop a class without a possible academic penalty

- 10/06/2009, In-class Exam I for M310T (SSC 318)

- 10/21/2009, Last day to drop with dean's approval

- 11/10/2009, In-class Exam II for M310T (SSC 318)

- 12/11/2009, Final exam for M310T (SSC 318)

Miscellaneous.

- The University of Austin provides upon request appropriate academic accommodations for qualified students with disabilities. For more information, contact the Office of the Dean of Students at 471- 6259, 471-6441 TTY.

- It is the policy of The University of Texas at Austin that you must notify the instructor at least fourteen days prior to the classes scheduled on dates you will be absent to observe a religious holy day.

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Lecture Schedule

- 08/27 (TH): Logistics and Introduction

- 09/01 (TU): Introduction to Matlab; HW #1 Handout

- 09/03 (TH): Functions and Vectors

- 09/08 (TU): Matrices in Matlab; HW #2 Handout

- 09/10 (TH): System of Equations (I)

- 09/15 (TU): Control Structures in Matlab (I); HW #3 Handout

- 09/17 (TH): Control Structures in Matlab (II)

- 09/22 (TU): Zeros and Roots; HW #4 Handout

- 09/24 (TH): Visualization of Data

- 09/29 (TU): Interpolation; HW #5 Handout

- 10/01 (TH): Review

- 10/06 (TU): **Exam I**

- 10/08 (TH): Least-Squares (I)

- 10/13 (TU): Least-Squares (II); HW #6 Handout

- 10/15 (TH): Probability (I)

- 10/20 (TU): Probability (II); HW #7 Handout

- 10/22 (TH): Statistics (I)

- 10/27 (TU): Statistics (II); HW #8 Handout

- 10/29 (TH): Numerical Integration (I)

- 11/03 (TU): Numerical Integration (II); HW #9 Handout

- 11/05 (TH): Review

- 11/10 (TU): **Exam II**

- 11/12 (TH): Euler's Method for ODEs; Class Project Handout

- 11/17 (TU): Monte Carlo Integration

- 11/19 (TH): Comments on Research

- 11/24 (TU): Case Studies in Scientific Computation

- 11/26 (TH): No class (Thanksgiving Holiday)

- 12/01 (TU): Review

- 12/03 (TH): Project Presentation

- 12/11 (FR): **Final Exam** Time: 9:00-12:00 Noon; Location: CPE 2.206

Note that there are probably minor changes on the schedule. Those changes will be announced in class.