



SIE 270: Mathematical Foundations of Systems and Industrial Engineering Spring 2019

Time and Location: Tues and Thur, 8:00am-9:15am, Aero & Mech Engr, Rm S212

Instructor: Jianqiang Cheng **Email:** jqcheng@email.arizona.edu

Office Location: ENGR 123

Office Hours: Tues and Thur, 9:30am-10:45am, or by appointment

Teaching Assistant: Xi Chen **Email:** xic@email.arizona.edu

Office Location: ENGR 122

Office Hours: Tues and Thur, 10:30am-11:45am, or by appointment

Teaching Assistant: Zaniar Ardalan **Email:** zaniarardalan@email.arizona.edu

Office Location: ENGR 259

Office Hours: Mon and Wed, 2:00pm-3:15pm, or by appointment

Course Description: Basics of data structures, transformations, computer methods, their implementation in MATLAB, and their applications in solving engineering problems.

Prerequisite(s):

1. Calculus, differentiation and integration
2. Ability to write and understand computer programs in a high level language, such as MATLAB
3. ECE 175 or CSC 127A, MATH 129, PHYS 141

Credit Hours: 3

Textbook: S. Yakowitz & F. Szidarovszky, An Introduction to Numerical Computation (2nd Edition), MacMillan, 1989.

Supplementary: B. Hahn & D. Valentine, Essential MATLAB for Engineers and Scientists, (5th Edition), Elsevier, 2013. (The book is available online.)

Course Website: We'll be using D2L(<https://d2l.arizona.edu/>). All class materials, including homework assignments, lecture notes, supplementary readings, etc. will be distributed in D2L. TAs and I will also be sending emails to the whole class throughout the semester using the classlist in D2L. You must check the announcements in D2L and your email at least twice a week.

Course Topics (subject to change):

1. Preliminaries: Survey of Matrix Theory; Computer Number Representation and Roundoff
2. Linear Equations
3. Polynomial Interpolation
4. Numerical Differentiation and Integration
5. Solutions of Nonlinear Equations
6. Data Fitting
7. Ordinary Differential Equations, Complex Numbers and Laplace Transforms (*)

– * means optional.

Course Requirements:

- Lectures: Students are expected to attend and participate in all lectures. Lecture materials will be posted in D2L. Some questions left in lectures will require you study by yourself.
- Reading: Reading materials from textbook or supplementary posted in D2L will be mentioned at the end of lecture notes. Students are responsible for completing these readings.
- Homework: There will be about **6** problem sets. Homework and its due date will be posted on D2L. Please hand in a (readable) pdf-file on D2L. **Late submission: No grade** is awarded if the homework is submitted after the due date.

Grading distribution:

Homework: 20%

In-class Midterm exam 1 (75-minute limit): 20%

In-class Midterm exam 2 (75-minute limit): 20%

Final exam: 40% 8:00am - 10:00am, Thursday, 5/9/2019

Bonus for in-class students: Quizzes and Attendance: 5% (Random choice of time)

Bonus for on-line students: Additional Homework: 5%

Note: For questions on grades, you have to talk to teaching assistant or the instructor within one week of grades posted.

Final Grade: A (90-100), B (80-89), C (70-79), D (60-69), E (< 60)

Class Notes: Selling class notes and/or other course materials to other students or to a third party for resale is **NOT permitted** without the instructor's express written consent. Providing student email addresses to a third party is not permitted. Violations to this and other course rules are subject to **the Code of Academic Integrity** and may result in course sanctions. Additionally, students who use D2L or UA email to **sell or buy** these copyrighted materials are subject to Code of Conduct Violations for misuse of electronic resources provided by The University of Arizona. This conduct may also constitute copyright infringement.

Academic integrity policy: All students are expected to commit themselves to be honest in all academic work and understand that failure to comply with this commitment will result in disciplinary action. This is a reminder to uphold your obligation as a UA student and to be honest in all work submitted and exams taken in this course and all others.

You are encouraged to make recommendations to improve the class and my teaching skills.

Note: This syllabus is tentative and the instructor reserves the right to make modifications if appropriate.