



## SIE 270: Mathematical Foundations of Systems and Industrial Engineering Spring 2021

**Time and Location:** Tues and Thur, 8:00am-9:15am; Online (Via Zoom)

**Course format:** Live Online

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

**Office Hours:** Tuesday and Thursday, 9:30 am-10:45 am, or by appointment, Online (Via Zoom) <https://arizona.zoom.us/j/84117210878>

**Teaching Assistant:** Kelsey Ingerson, **Email:** kingerson@arizona.edu

**Office Location:** Online (Via Zoom) <https://arizona.zoom.us/j/84037232456>

**Office Hours:** Wed 3:00 pm-4:30 pm, Fri 10:30 am-12:00 pm, or by appointment

**Teaching Assistant:** Guangrui Tang **Email:** guangruitang@email.arizona.edu

**Office Location:** Online (Via Zoom) <https://arizona.zoom.us/j/81490526689>

**Office Hours:** Tues 3:00 pm-4:30 pm, Thur 3:00 pm-4:30 pm 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:**

1. James F. Epperson, An Introduction to Numerical Methods and Analysis, (2nd Edition), Wiley, 2013. (The book is available online.)
2. 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.
8. Matlab and Implementation

**Course Requirements:**

- **Lectures:** This course is being presented in a "Live Online" format. Prior to each class meeting, students are required to watch last year's recorded lecture videos first. The instructor will share the recorded videos with students on Panopto under section "UA Tools" on D2L. During the class period, the instructor will make use of class time to cover more detailed explanations or examples to help students better understand concepts/materials. 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.

**Note:** For lecture recordings, which are used at the discretion of the instructor, students must access content in D2L only. Students may not modify content or re-use content for any purpose other than personal educational reasons. All recordings are subject to government and university regulations. Therefore, students accessing unauthorized recordings or using them in a manner inconsistent with UArizona values and educational policies are subject to suspension or civil action.

- **Class attendance:**

- If you feel sick, or may have been in contact with someone who is infectious, stay home. Except for seeking medical care, avoid contact with others and do not travel.
- Notify your instructors if you will be missing an online course meeting, or you will miss an assignment deadline.
- Non-attendance for any reason does not guarantee an automatic extension of due date or rescheduling of examinations.  
Please communicate and coordinate any request directly with your instructor.
- Campus Health is testing for COVID-19. Please call (520) 621-9202 before you visit in person.
- Visit the UArizona COVID-19 page for regular updates.

- **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: 30%

In-class Midterm exam (75-minute limit Via Zoom): 30%

8:00am-9:15am, Tuesday, March 16, 2021

Final exam (Via Zoom): 35% 8:00am - 10:00am, Thursday, 5/13/2021

Main Campus on-line students: Quizzes and Attendance (including 5% Bonus points): 10% (Random choice of time)

Yuma on-line students (including 5% Bonus points): Additional Homework: 10%

**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.