



## SIE 270: Mathematical Foundations of Systems and Industrial Engineering Spring 2022

**Time and Location:** Tues and Thur, 8:00am-9:15am; Aero & Mech Engr,Rm S212 **Course format:** In-Person

**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/86530824707>

**Teaching Assistant:** Azadeh Farsi, **Email:** azadehfarsi@email.arizona.edu

**Office Location:** Online (Via Zoom) <https://zoom.us/j/98990192439>, Passcode: SIE270

**Office Hours:** Wed 10:45 am-12:00 pm, Fri 12:45 pm-2:00 pm, or by appointment

**Grader:** Maesy Ramirez **Email:** maesy10@email.arizona.edu

**Office Location:** Online (Via Zoom) <https://arizona.zoom.us/j/6466534973>

**Office Hours:** Mon 1:00 pm-2:00 pm, Fri 9:00 am -10:30 am, 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. TA/Grader 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. Complex Numbers
7. Matlab and Implementation
8. Data Fitting, Ordinary Differential Equations, and Laplace Transforms (\*)  
– \* means optional.

### Course Requirements:

- **Lectures:** This course is being presented in a "in-person" format. Prior to each class meeting, students are encouraged 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.

**Recordings:** This course will be recorded via Panopto. 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 (Code of Academic Integrity and the Student Code of Conduct) are also subject to civil action.

- **Class attendance:**

- If you feel sick, or if you need to isolate or quarantine based on University protocols, stay home. Except for seeking medical care, avoid contact with others and do not travel.
- **Notify your instructor** if you will be missing a course meeting or an assignment deadline.
- Non-attendance for any reason does **not** guarantee an automatic extension of due date or rescheduling of examinations/assessments. Please communicate and coordinate any request directly with your instructor.
- If you must miss the equivalent of more than one week of class, you should contact the Dean of Students Office  
DOS-deanofstudents@email.arizona.edu to share documentation about the challenges you are facing.

- **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 (6 sets): 25%

Exams:

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

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

In-class Final Exam (2 hours): 30% 8:00am - 10:00am, Thursday, 5/12/2022

Quizzes and Attendance (including 5% Bonus points): 10% (Random choice of time)

**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.

**Specific COVID-19 related information and others:**

- **Statement on compliance with COVID-19 mitigation guidelines:** As we enter the Spring semester, the health and wellbeing of

everyone in this class is the highest priority. Accordingly, we are all required to follow the university guidelines on COVID-19 mitigation. Please visit [www.covid19.arizona.edu](http://www.covid19.arizona.edu) for the latest guidance

- **Masks** are required in our classroom.
- Voluntary, free, and convenient COVID-19 testing is available for students on Main Campus.
- If you test positive for COVID-19 and you are participating in on-campus activities, you must report your results to Campus Health. To learn more about the process for reporting a positive test, visit the Case Notification Protocol.
- The COVID-19 vaccine and booster is available for all students at Campus Health.
- Visit the UArizona COVID-19 page for the most up-to-date information.

**Academic advising:** If you have questions about your academic progress this semester, please reach out to your academic advisor (<https://advising.arizona.edu/advisors/major>). Contact the Advising Resource Center (<https://advising.arizona.edu/>) for all general advising questions and referral assistance. Call 520-626-8667 or email to [advising@arizona.edu](mailto:advising@arizona.edu)

**Life challenges:** If you are experiencing unexpected barriers to your success in your courses, please note the Dean of Students Office is a central support resource for all students and may be helpful. The Dean of Students Office can be reached at (520) 621-2057 or [DOS-deanofstudents@email.arizona.edu](mailto:DOS-deanofstudents@email.arizona.edu).

**Physical and mental-health challenges:** If you are facing physical or mental health challenges this semester, please note that Campus Health provides quality medical and mental health care. For medical appointments, call (520) 621-9202. For After Hours care, call (520) 570-7898. For the Counseling & Psych Services (CAPS) 24/7 hotline, call (520) 621-3334.

**Accessibility and Accommodations:** At the University of Arizona, we strive to make learning experiences as accessible as possible. If you anticipate or experience barriers based on disability or pregnancy, please contact

the Disability Resource Center (520-621-3268, <https://drc.arizona.edu>) to establish reasonable accommodations.

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.