COLLEGE OF ENGINEERING
Systems & Industrial Engineering

SIE 270: Mathematical Foundations of Systems and Industrial Engineering – Spring 2026

Time and Location: Tues and Thur, 8:00–9:15 AM; Aero & Mech Engr,Rm
S212 **Course format:** In-Person for Main Campus Students
Live Online (via Panopto) for Yuma Students
Instructor: Jianqiang Cheng   **Email:** jqcheng@arizona.edu
Office Location: ENGR 123
Office Hours: Tuesday and Thursday, 9:30–10:45 AM, or by appointment

Teaching Assistant: Ryan Mowlai   **Email:** mowlai@arizona.edu
Office Location: ENGR 124 (in-person)
and Zoom: https://arizona.zoom.us/j/86067738474
Office Hours: Tues and Thur, 3:15–4:30 PM, or by appointment

Course Description: This course introduces the mathematical foundations
and numerical methods commonly used in systems and industrial engineering. Topics include matrix theory, numerical solutions of linear and nonlinear equations, interpolation, numerical differentiation and integration, complex numbers, and computer number representation. All methods are implemented and tested using MATLAB.

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 or ECE 101, MATH 129, PHYS 141

Credit Hours: 3

Suggested Textbooks:

- James F. Epperson, An Introduction to Numerical Methods and Analysis, (3rd Edition), Wiley, 2021.

- 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. We 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

Course Requirements:

- **Lectures:** This course is being presented in a **"in-person"** format for the main campus students. The 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 to study by yourself.

- **Class attendance:**

  – **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 materials 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 without acceptable reasons approved by the instructor.

Grading distribution:
Homework (6 sets): 30%
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% 8:00–10:00 AM, Thursday, 5/14/2026
Attendance for Main Campus Students: **5% Bonus points**

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

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

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.

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

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.

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.