# MATH 107  Fall 2024  Course Syllabus
## Introduction to Computational Linear Algebra
Section 01, Course ID: 20072

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# Instructor Information

**Instructor:** Dr. Kristin Kurianski   **Office:** McCarthy Hall 182L (MH-182L)
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**Office hours:** Office hours are specific times that I have set aside in my schedule for you! I have no other plans during office hours, so please stop by during those times to ask me questions. I'm happy to talk with you about anything related to the course, general math concepts, coding issues, or education/career topics. If you plan to attend office hours, you must comply with the University COVID-19 policies.

- Mondays 4:00 PM - 5:00 PM (Hybrid, Zoom link in Canvas)
- Wednesdays 10:00 AM - 12:00 PM (Hybrid, Zoom link in Canvas)
- Or by appointment. Appointments require **24-hours' notice** and should **only** be made if you **cannot make it to the regularly scheduled office hours or need to discuss a personal matter** (e.g., grades). All appointments outside of office hours will meet virtually, and a Zoom link will be provided to you when the appointment is confirmed. If you need to cancel an appointment, please provide at least 30 minutes' notice via email. You can schedule an appointment with me by clicking the following link: [https://calendly.com/dr-kurianski/meeting](https://calendly.com/dr-kurianski/meeting).

# Course Information

**Course Name:** MATH 107-01 Introduction to Computational Linear Algebra (CID: 20072)
**Course website:** Canvas course titled Fall 2024 MATH 107-01 20072
**Time:** Mon/Wed 2:00 PM - 3:50 PM
**Location:** MH-452
**COVID-19 Information:** This is a synchronous class that will meet in-person. There is no option to attend this class virtually. To participate in this class, you must adhere to the University COVID-19 policies. See the [Presidential Directive 22](#) and [Vaccine Requirement FAQs](#) for more information. This syllabus will be updated if necessary based on guidelines set by the CDC and CSUF. Check the [Titans Return website](#) for details and campuswide policies.

# Course Description

This course is an introduction to linear algebra and computation with applications. Linear algebra topics include Euclidean spaces, matrices and matrix arithmetic, solving systems of equations, and eigenvalues and eigenvectors. Computation topics include variables, functions, conditionals, loops, and plotting.
**Course Prerequistes**: MATH 150A with a "C" (2.0) or better.

# Course Objectives and Learning Goals

By the end of this course, students will be able to:

- Manipulate matrices by hand and using MATLAB, including performing matrix addition, multiplication, and row reduction.
- Interpret vectors, matrices, and complex numbers algebraically and geometrically.
- Find the eigenvalues and eigenvectors of matrices and explain some of their applications.
- Write introductory-level programs in MATLAB with an understanding of how to manipulate matrices, use plotting features, and write code that includes functions, loops, and conditional statements.
- Communicate mathematics to others and collaborate in teams to complete tasks.

# Course Materials

## Required Textbooks

There are **two** required texts for this course:

1. *When Life Is Linear: From Computer Graphics to Bracketology* by Tim Chartier
2. Combined text of *Fundamentals of Matrix Algebra* by Gregory Hartman and *An Introduction to MATLAB* by Troy Siemers - **Free PDF on course website**

## Required Technology

For this course, you will need to have access to technology that will allow you to join Zoom meetings, view and upload assignments on Canvas, and create MATLAB programs. If you do not have access to the necessary technology, you may be able to request a laptop, MiFi (wi-fi hotpot), and/or headset from the CSUF IT Department by filling out this form. You can get free and low-cost software for being an active CSUF student. Software downloads and request forms can be found on the CSUF Student Software website.

- **MATLAB:** You will be required to use MATLAB for in-class and homework assignments. MATLAB is available for free to all CSUF students. Visit the following link for instructions:

  Click for MATLAB software info from CSUF IT.

  If you are unable to install MATLAB on your computer, you can use MATLAB Online. MATLAB is also available during school hours on the computers in the Pollack library.

- **Canvas:** We will be using the Canvas Learning Management System for all course materials and communication. See the section of this syllabus titled Canvas.

- **Campuswire:** We will be using Campuswire for course discussions. Please create an account and join the Campuswire discussion board for this course through the email that will be sent to your CSUF email address.

- **Zoom:** For this course, you will need to have access to technology that will allow you to join Zoom for lectures and office hours.

- In addition to the above, students are expected to: (i) Have basic computer competency (locate, create, move, copy, delete, name, rename, and save files; create, name, rename, and organize folders/directories); (ii) Have ongoing reliable access to a computer with Internet connectivity for regular course assignments; (iii) Maintain and access regularly their CSUF student email account; (iv) Apply his/her educational technology skills to complete expected competencies.

## Technology Requests

If you do not have access to the necessary technology, you may be able to request a laptop, MiFi (wi-fi hotpot), and/or headset from the CSUF IT Department by filling out this form.

## Software for Students

You can get free and low-cost software for being an active CSUF student. Software downloads and request forms can be found on the CSUF Student Software website.

# Policies and Expectations

**E-mail**

- Please email me from your CSU Fullerton account, as other email addresses may be filtered into my Spam folder.
- Emails will be given a response within **2 business days and only during regular business hours (i.e., M-F, 9 AM - 5 PM).**
- I generally do not respond to emails in the evenings or over weekends. If your question is something that your classmates may be able to answer, try posting on Campuswire.
- All emails should be written using proper grammar, spelling, and punctuation.
- If emails require a lengthy reply, I may suggest coming into office hours as a response.

**Course Engagement**

- **If you miss any classes during the first week without notifying the instructor or the departmental office within 24 hours of the meeting, you may be dropped from the course.**
- Course Engagement accounts for 10% of your course grade and will be graded based on Campuswire participation and Pre-Notes completion, with Pre-Notes receiving greater weight.
- **Campuswire:** As part of your course engagement grade, you will be expected to earn at least 10 "reputation points" in Campuswire throughout the semester. Reputation points may be earned by posting questions, answering classmates questions, and engaging in discussions. If you make a new posts, your post must contain substance (i.e., you will not receive credit for posts that do not contain relevant questions and/or contribute to discussions or that duplicate existing posts). All reputation points must be earned by 11:59 PM on Friday, December 13, 2024.
- **Pre-Notes:** Throughout the semester, you will be assigned portions of the textbook to read and will be expected to take notes on each reading assignment (these notes are called "Pre-Notes"). You must submit Pre-Notes **prior to the start of each lecture**, with the exception of the first lecture. Pre-Notes will be submitted in Canvas using Gradescope. Instructions for the content of Pre-Notes will be outlined on the first day of class. These are crucial for your understanding of the material in lectures and participation in in-class assignments. Pre-Notes will be graded based on completeness rather than correctness. Pre-Notes must be handwritten (either on paper or using a table device). Screenshots or photos of the textbook will not receive credit. No late Pre-Notes will be accepted, and there are no make-up Pre-Notes. **The four lowest Pre-Note scores at the end of the semester will be dropped.**

**Homework**

- There will be several homework assignments due on **Fridays at 5:00 PM** during the weeks outlined in the Tentative Schedule in this document. Homework assignments are worth a total of 10% of your course grade.
- You may not certify any standards via homework, but homework allows you to practice for Skill Checks.
- Any necessary MATLAB code, figures, and/or written solutions for each assignment will need to be submitted through the Canvas course website. Homework assignments will be submitted in Canvas using MATLAB Grader and Gradescope (unless otherwise stated).
- Handwritten work must be submitted as a **single PDF**. You can scan (at home or in the campus library) or photograph your written solutions using apps like Genius Scan, Adobe Scan, or Dropbox Scan to create PDFs using a cellphone. Another option is to create a typed document using word processing software like Microsoft Word or LaTeX and convert it to PDF. Typed documents must

use correct mathematical formatting. Scanned work must be clear and legible. **Any work that is illegible or cut off in the PDF will not receive credit.**

- **Late Homework:** An automatic two-day, penalty-free extension is applied to all homework assignments. Homework will not be accepted after 11:59 PM on the Sunday immediately following the assignment deadline. The lowest homework score at the end of the semester will be dropped.

## Skill Checks

This course uses standards based grading, which differs in some significant ways from traditional points-based grading. With a few exceptions, all assignments and assessments are graded as either "proficient" or "revise." Proficiency is attained on each skill by earning a score of 4 or 5 according to the following rubric.

| Score | Description |
|-------|-------------|
| 5 | Computations and solution are correct (no errors) and correct notation was used. There is work that demonstrates that you understand the concept and technique. Moreover, your work is nicely organized, easy to read, and easy to follow. If diagrams are included, they are clearly labeled. |
| 4 | Most of the computations are correct, but there might be up to two small errors. Any diagrams that are used are not labeled clearly, even if they express the correct idea. Your solution is correct, but your organization could be improved to make it easier to read. Several steps are skipped and make the reader wonder if you understand the concept or technique. |
| 3 | A major mistake is committed in the work OR there are so many small mistakes that it is diffcult to assess if you understand the concept or technique. You could have the right idea but did not execute a correct solution and the solution is disorganized to the point that it is clear that the concept or technique is not understood. If any diagrams are included, they are labeled incorrectly or not labeled at all. So much work is skipped that the reader may wonder if the solution was looked up and not your own. |
| 2 | Combination of major and minor errors that make it clear that the concept and technique are not understood. There is minimal work shown, to the point that cheating may be suspected. There are no diagrams even when they are required. |
| 1 | There is work on the paper but it may not be relevant to the problem and/or does not make progress towards a solution. |
| 0 | Blank problem or an answer is provided with no work or explanation. |

Each Skill Check acts as an assessment that will contain the relevant standards outlined later in this document under **Standards and Learning Objectives**. To demonstrate mastery of these skills, you will have to **certify** each **Essential Skill twice** and each **Important Skill once** during the semester. Opportunities to certify these skills will be given in the Skill Checks, which take place on dates below. The first three Skill Checks will last 60 minutes, while the remaining Skill Checks will last 110 minutes. You may only certify a given standard **once per Skill Check**.

## Final Exam

The Final Exam will be 110 minutes and serves two purposes:

1. The Final Exam will first be graded using a typical 0%–100% scale (with partial credit where appropriate) and account for 10% of your total course grade.

2. You will also be able to certify standards via the Final Exam.

| | |
|---|---|
| **Skill Check 1** | **Wednesday, September 11, 2024** during the first hour of class (Week 3) |
| **Skill Check 2** | **Wednesday, September 25, 2024** during the first hour of class (Week 5) |
| **Skill Check 3** | **Wednesday, October 9, 2024** during the first hour of class (Week 7) |
| **Skill Check 4** | **Wednesday, October 23, 2024** during class (Week 9) |
| **Skill Check 5** | **Wednesday, November 6, 2024** during class (Week 11) |
| **Skill Check 6** | **Wednesday, November 20, 2024** during class (Week 13) |
| **Skill Check 7** | **Monday, December 9, 2024** during class (Week 15) |
| **Final Exam** | **Wednesday, December 18, 2024**,  **3:00 PM-4:50 PM** (Finals Week) |

**Missing an Exam/Skill Check**

No make-up Skill Checks will be given since this is a standards based course. You will have ample opportunities to demonstrate that you have met or exceeded the standards. The only exam that may require a make-up is the final and only in case of a medical or family emergency. These emergencies require valid documentation. In the even of an emergency, you must contact me within 24 hours of your missed exam to request a make-up exam. If you are granted a make-up exam, the type of make-up exam will be discussed with the instructor on a case-by-case basis.

# Technical Problems

If you are ever unable to submit an assignment via Canvas and/or Gradescope due to technical difficulties, you must **contact me via email with evidence of the technical issues (e.g., screenshots, emails to IT, etc.) no later than the day the assignment is due**. Emails that do not contain evidence of the issue will not receive accommodation. It is the student's responsibility to ensure that files are readable. Corrupted files will be treated as non-submissions. In the event that you experience technical problems that inhibit your ability to adhere to any other policies in this syllabus, you must reach out to me via email as soon as possible.

# Grading

| Grading Scheme | Grading Scale | | | |
|---|---|---|---|---|
| Course Engagement: 10% | A+ | 97.0%-100% | B- | 80.0%-82.9% |
| Homework: 10% | A | 93.0%-96.9% | C+ | 77.0%-79.9% |
| Essential Standards: 50% | A- | 90.0%-92.9% | C | 70.0%-76.9% |
| Important Standards: 20% | B+ | 87.0%-89.9% | D | 55.0%-69.9% |
| Final Exam: 10% | B | 83.0%-86.9% | F | 0%-54.9% |

The following table serves as a guidepost to give you an idea of how you will be graded. Your grade in the course is determined by the number of standards that you score proficient (4 or 5) on by the end of the semester, according to the rubric provided previously. In other words, if you want to guarantee the grade in the table below, then it is best to ensure that you have met each of the criteria, otherwise if you miss at least one requirement, then it is likely that you will earn the grade in which all requirements are met.

| Grade you want to earn: | At least 90% (A-) | At least 80% (B-) | At least 70% (C) | At least 60% (D) |
|---|---|---|---|---|
| Pre-Notes | Earn at least 80% of points | Earn at least 70% of points | Earn at least 60% of points | Earn at least 50% of points |
| Campuswire | Earn at least 80% of points | Earn at least 70% of points | Earn at least 60% of points | Earn at least 50% of points |
| Homework | Earn at least 90% of points | Earn at least 70% of points | Earn at least 60% of points | Earn at least 50% of points |
| Essential Standards | Certify at least 18 Essential Standards twice | Certify at least 16 Essential Standards twice | Certify at least 14 Essential Standards twice | Certify at least 12 Essential Standards twice |
| Important Standards | Certify at least 9 Important Standards once | Certify at least 8 Important Standards once | Certify at least 7 Important Standards once | Certify at least 6 Important Standards once |
| Final Exam | Earn at least 90% of points | Earn at least 80% of points | Earn at least 75% of points | Earn at least 60% of points |

In determining grades, I cannot and do not take into consideration a student's intended graduation date, financial aid, course repeats, or any other factors that are external to the course requirements. Doing so would be both unethical and unfair to the majority of students in the course. Moreover, as you will have ample opportunities to demonstrate that you have met or exceeded the standards, I do not curve grades.

For information on withdrawals and incompletes, see the following University Policy Statements: UPS 300.016 (Withrdawal), UPS 300.018 (Unauthorized Withdrawal), and UPS 300.017 (Incomplete).

### Viewing Graded Assignments

Assignments and exams will be graded using either Canvas or Gradescope. Because this is done virtually, you will not receive a paper copy of your graded work. Instead, you can view your graded work along with my comments in Canvas or on the Gradescope website, depending on the assignment. You also have the option of downloading your graded assignments if you wish to retain them after the semester ends. Any graded assignment that you wish to keep must be downloaded before the Friday of finals week. Please see the Gradescope Help page in our Canvas course or this webpage for instructions on viewing graded assignments in Gradescope.

## Course Communication

Course announcements will be made through Canvas, which only uses CSUF email accounts. You must check your CSUF email on a regular basis for the duration of the course. Assignments, lecture summaries, and additional resources will be posted on Canvas, as well. You will also be required to upload your homework to the website by the end of each due date. We will use Campuswire for course discussions outside of lecture. See the section titled Required Technology for details on joining Campuswire.

As a registered student, you are enrolled in Canvas. You may access Canvas for all your classes by clicking on your student portal, found on the CSUF website. If you experience problems with Canvas, you can use the following resources: Review the Canvas Help page in our Canvas course; Contact the Canvas support hotline at 855-302-7528; Visit the website for Canvas Support Resources for Students; Email StudentITHelpDesk@fullerton.edu.

## Important Academic Calendar Dates

You can find the following information on the [CSUF Registration Calendar](#).
- **September 10 (Tuesday):** Last day for students to ADD **with a permit**. All permits expire at midnight on September 10 (Tuesday); Last day to DROP without a grade of "W". Add/Drop is through TITAN Online.
- **September 23 (Monday):** Last day the Math Department will be flexible on the approval of non-medical withdrawal requests. Beginning Tuesday, September 24, students must have a serious and compelling reason for non-medical withdrawal requests and must provide supporting documentation for their reason.
- **November 15 (Friday):** Last day to withdrawal with a truly serious and compelling reason that is clearly beyond the student's control. Students must document their reason.
- **December 6 (Friday):** Last day to withdraw for medical reasons. Students must document their reason.

## Academic Integrity

Students who violate university standards of academic integrity are subject to disciplinary sanctions, including failure in the course and suspension from the university. Since dishonesty in any form harms the individual, other students, and the university, policies on academic integrity are strictly enforced. Examples of academic dishonesty include, but are not limited to: (1) copying from another student's homework, discussion post, Pre-Notes, Skill Check, or MATLAB code; (2) allowing another student to copy your work; (3) copying homework solutions from the text solutions manual; (4) copying and/or soliciting solutions to homework or Skill Checks from online sources; and (5) copying work/materials from previous offerings of this course. You should familiarize yourself with the academic integrity guidelines found in the current student handbook.

I encourage you to use the resources listed in the syllabus and posted to Canvas. Before using other resources that you find online, I encourage you to discuss them with me. The use of sites, including but not limited to chatpGPT, Chegg, Slader, and Course Hero, which may provide solutions to homework problems, exam questions, etc., is explicitly prohibited in this course and is considered academic dishonesty. The use of artificial intelligence (AI) on any assignment is considered academic dishonesty.

Collaborating has been made easier by the many tools available to use on the internet (e.g. Discord, Campuswire, Zoom, Microsoft Teams). I encourage you to use these tools to work together and to form study groups. However, the work you submit must be completely your own and must not be copied from anyone else. Using these communication tools for unauthorized collaboration is considered academic dishonesty. **All Skill Checks must be completed on your own without collaboration of any kind.** Electronic devices such as mobile phones, tablets, smart watches, laptops, or any other such device are prohibited on all assessments, including Skill Checks.

Consequences for violating academic integrity policies include:

1. Academic penalty, including, but not limited to: oral reprimand; "F" or 0 on assignment; grade reduction on assignment or course; or "F" in the course.
2. Report will be made about the student(s) involved and sent to the department chair and to the Dean of Students office, Student Conduct.
3. The Dean of Students office, Student Conduct, shall maintain a disciplinary file for each case of academic dishonesty with the appropriate documentation.

Please see the [University Policy Statement (UPS) 300.021](#) for more details.

## Accommodations

**Disability Support Services (DSS):** The university requires students with disabilities to register with the Office of Disability Support Services (DSS), located in UH-101, in order to receive prescribed reasonable accommodations appropriate to their disability. Students requesting accommodations should inform the instructor during the first week of classes about any disability or special needs that may require specific arrangements/accommodations related to attending class sessions, completing course assignments, writing papers or quizzes/tests/examinations. Additional information can be found by: Visiting the DSS website; Calling 657-278-3112; Emailing dsservices@fullerton.edu.

**Religious Accommodations:** You may request reasonable accommodations in order to practice your religion. Please reach out to me via email if this applies to you, and I will contact the proper channels to assess your request.

## Emergency Procedures

In the event of an emergency such as an earthquake or fire:

- Take all your personal belongings and leave the classroom. Use the stairways located at the east, west, or center of the building.
- Do not use an elevator. They may not be working once the alarm sounds.
- Go to the lawn area towards Nutwood Avenue. Stay with class members for further instruction.
- For additional information on exits, fire alarms, and telephones, building evacuation maps are located near each elevator.
- Anyone who may have difficulty evacuating the building, please see the instructor.

A list of actions students should take in an emergency can be found at the Emergency Preparedness website.

# Tentative Schedule

(The following schedule is subject to change.)

| Week | Dates | Monday Assigned Reading or Activity | Wednesday Assigned Reading or Activity | Homework |
|---|---|---|---|---|
| 1 | 8/26-8/30 | L1: Intro to MATLAB | L2: Matrix operations | HW0 due Fri |
| 2 | 9/2-9/6 | No Class | L3: Applications | HW1 due Fri |
| 3 | 9/9-9/13 | L4: Built-in functions | L5: Plotting **SC1 on 9/11** | HW2 due Fri |
| 4 | 9/16-9/20 | L6: User-defined functions | L7: Branching | HW3 due Fri |
| 5 | 9/23-9/27 | L8: Loops | L9: Loops continued **SC2 on 9/25** | HW4 due Fri |
| 6 | 9/30-10/4 | L10: Geometry of vectors | L11: Nested loops | HW5 due Fri |
| 7 | 10/7-10/11 | L12: Complex numbers | L13: Complex numbers continued **SC3 on 10/9** | HW6 due Fri |
| 8 | 10/14-10/18 | L14: Systems of LEs | L15: Gaussian elimination | HW7 due Fri |
| 9 | 10/21-10/25 | L16: Vector solutions | **SC4 on 10/23** | HW8 due Fri |
| 10 | 10/28-11/1 | L17: Inverses | L18: Inverse/transpose properties | HW9 due Fri |
| 11 | 11/4-11/8 | L19: Determinants | **SC5 on 11/6** | HW10 due Fri |
| 12 | 11/11-11/15 | No Class | L20: Eigenstuff | HW11 due Fri |
| 13 | 11/18-11/22 | L21: Eigenstuff | **SC6 on 11/20** | HW12 due Fri |
| 13.5 | 11/25-11/29 | L22: Applications | Fall Recess | |
| 14 | 12/2-12/6 | L23: Applications | L24: Programming practice | HW13 due Fri |
| 15 | 12/9-12/13 | **SC7 on 12/9** | L25: Review | – |
| Finals Week | 12/16-12/20 | – | **Final Exam (12/18)** 3:00 PM-4:50 PM | – |

# MATH 107 Introduction to Computational Linear Algebra
## Standards and Learning Objectives

Print the following two pages to check off standards as you certify them. You may bring **only** these two pages with you to Skill Checks as a reminder of the standards you have left to complete. No additional notes may be written on these pages. No outside resources are allowed during Skill Checks.

## Essential Skill Standards (Certify Twice, 19 Total)

### Section E-B: MATLAB Basics.

☐ ☐ E-B1. **Creating variables.** I can create variables in MATLAB and use them appropriately in computations.

☐ ☐ E-B2. **Indexing matrices.** I can use indexing (including logical indexing) to extract and/or change elements of a matrix.

☐ ☐ E-B3. **Equally-spaced vectors.** I can use appropriate MATLAB commands to create equally-spaced vectors.

☐ ☐ E-B4. **Generating plots.** I can create plots in MATLAB using appropriate input vectors and line/marker styles.

### Section E-P: Computer Programming.

☐ ☐ E-P1. **User-defined functions.** I can correctly create and call a user-defined function to solve a given problem.

☐ ☐ E-P2. **For loops.** I can correctly create an appropriate `for` loop to solve a given problem.

☐ ☐ E-P3. **While loops.** I can correctly create an appropriate `while` loop to solve a given problem.

☐ ☐ E-P4. **Branching.** I can correctly create an appropriate `if` statement to solve a given problem, which may also require `elseif` and/or `else` statements.

☐ ☐ E-P5. **Debugging.** Given a program that contains errors, I can correct all errors so that the program completes its intended task.

### Section E-M: Matrix computations.

☐ ☐ E-M1. **Matrix algebra.** I can perform matrix multiplication, matrix addition, and scalar multiplication by hand.

☐ ☐ E-M2. **Determinant.** I can compute the determinant of a given matrix by hand.

☐ ☐ E-M3. **Inverse.** I can compute the inverse of a given matrix by hand.

☐ ☐ E-M4. **Eigenvalues.** I can find the eigenvalues of a given square matrix by hand.

☐ ☐ E-M5. **Eigenvectors.** I can compute all eigenvectors associated with a given eigenvalue by hand.

### Section E-L: Systems of linear equations.

☐ ☐ E-L1. **Systems as matrices.** I can translate back and forth between a system of linear equations and the corresponding augmented matrix.

☐ ☐ E-L2. **Row reduction.** I can correctly reduce a matrix to reduced row-echelon form.

☐ ☐ E-L3. **Systems of linear equations.** I can compute the solution set for a system of linear equations.

☐ ☐ E-L4. **Existence and uniqueness.** I can determine whether a system of equations has one, zero, or infinitely many solutions with appropriate reasoning.

☐ ☐ E-L5. **Infinite solutions.** I can correctly express an infinite solution set using appropriate free variables.

# Important Skill Standards (Certify Once, 10 Total)

### Section I-P: Programming Concepts.

☐ I-P1. **Built-in functions.** I can use the correct syntax of appropriate built-in MATLAB functions to complete a programming task.

☐ I-P2. **Concatenating matrices.** I can correctly concatenate multiple matrices in MATLAB to create a desired new matrix.

☐ I-P3. **Plot attributes.** I can add appropriate legends, axis labels, and title text to a MATLAB plot.

☐ I-P4. **Local variables.** I can correctly track the values of local variables by hand for calling a given function.

☐ I-P5. **Tracking a loop.** I can correctly keep track of variable values within a loop by hand and explain the computations.

☐ I-P6. **Nested loops.** I can correctly create an appropriate nested loop to solve a given problem.

### Section I-M: Determine Matrix Information.

☐ I-M1. **Matrix features.** I can identify a given matrix as square, diagonal, symmetric, skew-symmetric, upper triangular, and/or lower triangular.

☐ I-M2. **Determine invertibility.** I can determine whether a matrix is invertible without attempting to compute the inverse.

### Section I-C: Complex numbers.

☐ I-C1. **Complex algebra.** I can correctly perform algebraic computations with complex numbers.

☐ I-C2. **Complex number representation.** I can correctly convert between polar and Cartesian representations of complex numbers.