FLORIDA POLYTECHNIC UNIVERSITY

# Course Syllabus

## Course Information

- **Course Number and Title:** MAS3114.02– Computational Linear Algebra
- **Credit Hours:** 3
- **Current Academic Term:** Spring 2026

## Instructor Information

- **Instructor:** Dr. Jaeyoun Oh
- **Office:** IST-2017
- **Office Hours:** MWF 1:00-2:00PM
- **E-mail:** joh@floridapoly.edu

## Course Details

- **Class Meeting Day, Time & Location:** MWF 11:00-11:50AM, IST 1045
- **Official Catalog Course Description**: Linear equations, matrices, and determinants; vector spaces and linear transformations; inner products and eigenvalues. This course emphasizes computational aspects of Linear Algebra.
- **Course Pre-Requisites:** MAC 2312 - Analytic Geometry and Calculus 2 with a grade of C or higher
- **Communication/Computation Skills Requirement (6A-10.030)**: No
- **Required Texts**: Interactive Linear Algebra
- **Equipment and Materials**: Be able to access MATLAB using campus resources. You are highly encouraged to bring a scientific calculator or laptop/tablet to class every day to access the course content and online tools.

## Course Objectives:

Students will gain a practical and theoretical understanding of fundamental principles of linear algebra. Emphasis will be given to learning critical concepts to include independent and dependent vectors, bases, matrices, matrix operations, determinants, orthogonality, Eigenvalues, Eigenvectors, linear transformations, rank, null space, and a complete understanding of rectangular linear systems of equations.

## Course Learning Outcomes:

1. Conceptual Understanding: Students will demonstrate a solid understanding of key concepts in linear algebra, including vectors, matrices, systems of linear equations, eigenvalues, and eigenvectors.

2. Matrix Operations: Students will be proficient in performing fundamental matrix operations, such as addition, subtraction, scalar multiplication, matrix multiplication, and finding the inverse of a matrix.

3. Solving Systems of Equations: Students will be able to solve systems of linear equations using methods such as Gaussian elimination, matrix equations, inverse matrices, and solve least squares problems.

4. Vector Spaces and Linear Transformations: Students will comprehend the concept of vector spaces, identify bases and linear independence, and analyze linear transformations, including composition and properties such as kernel and image.

5. Technology: Students will use MATLAB as an aid in solving problems and presenting solutions.

## Academic Support Resources

- **Library**: Students can access the Florida Polytechnic University Library through the University website and Canvas, on and off campus. Students may direct questions to library@floridapoly.edu.
- **Tutoring and Learning Center**: The Tutoring and Learning Center (The TLC) provides tutoring to all Florida Poly students who may need additional academic support. The TLC is staffed by students who have excelled in the courses they tutor. They offer support by reviewing concepts and materials from class, clarifying points of confusion and providing assistance with learning strategies. While the focus of TLC is to provide support to students in freshman-level courses, upper-level courses are also tutored at the Center. The TLC is located in the IST Commons (second floor).
    - **Knack Tutoring**: Students looking for additional assistance outside of the classroom are advised to consider working with a peer tutor through Knack. Florida Polytechnic University has partnered with Knack to provide students with access to verified peer tutors who have previously aced this course. To view available tutors, visit floridapoly.joinknack.com and sign in with your student account.
- **Academic Success Coaches**: All students at Florida Poly are assigned an Academic Success Coach. Your Academic Success Coach can assist you with academic success strategies. Please visit the Student Success Center on the second floor of the IST building to meet with an Academic Success Coach.

- **Writing Center**: Located on the second floor of the IST (2059/2061), the Writing Center helps students to develop their writing and presentation skills. Consultations are available in person and virtually. For more detail, visit Writing Center.

## Course Policies:

*Attendance*

Students in face-to-face courses are expected "to attend all of their scheduled University classes and to satisfy all academic objectives as defined by the instructor" (University Policy, FPU-5.0010AP) (see also University Policy).

[Falsifying attendance for yourself or for another student is an act of academic dishonesty and subject to academic discipline.]

A+ Attendance will be used to track attendance.

## Participation

Students are expected to participate in the classroom experience. The use of earbuds/headphones during class is specifically not allowed and students who engage in this behavior may be asked to leave the class for the day (noting exceptions for authorized accommodations). In addition, students who routinely do not bring materials to class that are required for participation, will not be given credit for class attendance, and if this becomes a pattern of behavior, may be asked to leave the class for the day. Persistent problems with participation may result in a code of conduct referral.

## Grading Scale:

| A | B+ | B | B- | C+ | C | D | F |
|---|---|---|---|---|---|---|---|
| 90% | 87% | 83% | 80% | 77% | 70% | 60% | 0% |

## Assignment/Evaluation Methods:

Homework: 10%
Labs: 8%
Quizzes: 10%
Midterm Exams (3 at 15% each): 45%
Final exam: 25%
Attendance: 2%

**Midterm Exams**: There will be three exams during the semester, both common and administered during class times, with tentative dates in the topic schedule at the end of the syllabus.

**Final Exam**: The final exam will be comprehensive, taken by all students, and administered during the final exam period. **The final exam will replace your lowest exam score up to a maximum of 80%; however, an unexcused missed exam will NOT be replaced.**

**Labs:** The labs will be assigned as homework and the results and codes must be submitted through Canvas.

**Homework**: Homework will consist of problems from the textbook and will be posted on Canvas. It must be submitted electronically through Canvas in a single pdf file. If multiple files are submitted, only one will be graded. Homework should be legible and well organized. Illegible and ill-organized homework will get no credit. **The lowest homework grades will be dropped.**

**Quizzes:** Quizzes will be given in class, approximately on the week specified in the schedule below. **One lowest quiz will be dropped.**

## Classroom Rules:

**Laptops/tablets should only be used for class purpose and not for working on assignments for other courses.** Cell phones **MUST** be on silent/mute mode and should not be used to the extent that they disturb other students or distract from class participation.

## Late Work/Make-up work:

Homework submitted up to 24 hours late will be accepted with a 20% penalty. No submissions will be accepted more than 24 hours late. Failing in submitting by the deadline due to technical issues is still considered a late submission. It is your responsibility to ensure that you are sending the correct file. You will not be able to submit the correct file after the due date passes regardless of the reason why you submitted the incorrect one in the first place. Extensions without penalty may be granted on a case-by-case basis. Please communicate with your instructor.

The instructor will only allow make-up exams in extreme circumstances provided you have sufficient documentation for your absence. If you miss an exam because you are participating in a university-sponsored activity, the instructor must be informed in writing before the exam and be provided with documentation.

## University Policies

### Reasonable Accommodations

The University is committed to ensuring equal access to all educational opportunities. The Office of Disability Services (ODS), facilitates reasonable accommodations for students with disabilities and documented eligibility. It is the student's responsibility to self-identify as a student with disabilities and register with ODS to request accommodations. If you have already registered with ODS, please ensure that you have requested an accommodation letter for this course through the ODS student portal, and communicate with your instructor about your approved

accommodations as soon as possible. Arrangements for testing accommodations must be made in advance. Accommodations are not retroactive. If you are not registered with ODS but believe you have a temporary health condition or permanent disability requiring an accommodation, please contact ODS as soon as possible: DisabilityServices@floridapoly.edu; (863) 874-8770; Disbility Services.

### Accommodations for Religious Observances, Practices and Beliefs

The University will reasonably accommodate the religious observances, practices, and beliefs of individuals in regard to admissions, class attendance, and the scheduling of examinations and work assignments. (See University Policy.)

### Title IX

Florida Polytechnic University is committed to ensuring a safe, productive learning environment on our campus that prohibits sex discrimination and sexual misconduct, including sexual harassment, sexual assault, dating violence, domestic violence and stalking. Resources are available if you or someone you know needs assistance. Any faculty or staff member you speak to is required to report the incident to the Title IX Coordinator. Please know, however, that your information will be kept private to the greatest extent possible. You will not be required to share your experience. If you want to speak to someone who is permitted to keep your disclosure confidential, please seek assistance from the Florida Polytechnic University Ombuds Office, BayCare's Student Assistance Program, 1-800-878-5470 and locally within the community at Peace River Center, 863-413-2707 (24-hour hotline) or 863-413-2708 to schedule an appointment. The Title IX Coordinator is available for any questions to discuss resources and options available.

### Academic Integrity

Violations of academic integrity regulation include actions such as cheating, plagiarism, use of unauthorized resources (including but not limited to use of Artificial Intelligence tools), illegal use of intellectual property, and inappropriately aiding other students. Such actions undermine the central mission of the university and negatively impact the value of your Florida Poly degree. Suspected violations will be fully investigated, possibly resulting in sanctions up to and including expulsion from the university.

### Recording Lectures

Students may, without prior notice, record video or audio of a class lecture for a class in which the student is enrolled for their own personal educational use. Recordings may not be used as a substitute for class participation or class attendance. Recordings may not be published or shared in any way, either intentionally or accidentally, without the written consent of the faculty member. Failure to adhere to these requirements is a violation of state law (subject to civil penalty) and the student code of conduct (subject to disciplinary action). *Recording class activities including, but not limited to, lab sessions, student presentations (whether individually or part of a group), class discussion (except when incidental to and incorporated within a class lecture), and invited guest speakers is* ***prohibited****.*

## Communication

Students with a concern or issue should feel free to email their instructor. Instructors will make every reasonable effort to respond by the end of the next class day. If, after sending the instructor a follow-up email, the issue is not resolved, the student may email the department chair, Dr. Mike Brilleslyper at mbrilleslyper@floridapoly.edu. Students may request an appointment with the department chair for further discussion, if needed.

## Course Schedule (Subject to Change)

Important Dates: https://floridapoly.edu/academics/academic-calendar/index.php

| Week | Monday | Wednesday | Friday |
|---|---|---|---|
| Week 1<br>Jan 12-Jan 16 | Introduction<br>1.1 Systems of Linear Equations | 1.1 Systems of Linear Equations | 1.2 Row Reduction |
| Week 2<br>Jan19-Jan 23 | **MLK Holiday**<br>**-No Class** | 1.3 Parametric form | 2.1 Vectors |
| Week 3<br>Jan 26-Jan 30 | 2.2 Vector Equations and Spans | 2.3 Matrix Equations<br>**Quiz 1** | 2.4 Solution Sets |
| Week 4<br>Feb 2-Feb 6 | 2.5 Linear Independence | Review | **Exam 1** |
| Week 5<br>Feb 9-Feb 13 | 2.6 Subspaces | 2.6 Subspaces<br>2.7 Basis and Dimension | 2.7 Basis and Dimension<br>2.8 Bases as Coordinate Systems |
| Week 6<br>Feb 16-Feb 20 | 2.8 Bases as Coordinate Systems<br>2.9 The Rank Theorem | 3.1 Matrix Transformations<br>**Quiz 2** | 3.2 One-to-one and Onto Transformations |
| Week 7<br>Feb 23-Feb 27 | 3.2 One-to-one and Onto Transformations | 3.3 Linear Transformations | 3.4 Matrix Multiplication |
| Week 8<br>Mar 2-Mar 6 | 3.5 Matrix Inverses<br>3.6 The Invertible Matrix Theorem | Review | **Exam 2** |

| | | | |
|---|---|---|---|
| Week 9<br>Mar 9-Mar 13 | 4.1 Determinants: Definition | 4.2 Cofactor Expansions | 4.3 Determinants and Volumes |
| Week 10<br>Mar 16-Mar 20 | **Spring Break** | **Spring Break** | **Spring Break** |
| Week 11<br>Mar 23-Mar 27 | 5.1 Eigenvalues and Eigenvectors | 5.2 The Characteristic Polynomial | 5.3 Similarity<br>5.4 Diagonalization |
| Week 12<br>Mar 30-Apr 3 | 5.4 Diagonalization | 5.5 Complex Eigenvalues<br>**Quiz 3** | 5.6 Stochastic Matrices |
| Week 13<br>Apr 6-Apr 10 | 5.6 Stochastic Matrices<br>Review | Review | **Exam 3** |
| Week 14<br>Apr 13-Apr 17 | 6.1 Dot Products and Orthogonality<br>6.2 Orthogonal Complements | 6.2 Orthogonal Complements<br>6.3 Orthogonal Projection | 6.3 Orthogonal Projection<br>**Quiz 4** |
| Week 15<br>Apr 20-Apr 24 | 6.4 Orthogonal Sets | 6.5 The Method of Least Squares<br>**Quiz 5** | 6.5 The Method of Least Squares |
| Week 16<br>Apr 27-May 1 | **Review** | **Reading Day**<br>**-No Class** | **Reading Day**<br>**-No Class** |