

Course Objectives:

- To understand several important concepts in linear algebra, including linear mappings and isomorphisms; inner products and inner product spaces; orthonormal bases; orthogonal and symmetric matrices; orthogonal diagonalization; quadratic forms; vector spaces over \mathbb{C} ; unitary, Hermitian, and normal matrices; unitary diagonalization.
- To improve your ability to prove mathematical results.
- To expand your knowledge of MATLAB.

Course Schedule

Week	Dates	Text Sections	Topics
1	Sept 10 - 14	7.1, 7.2, 8.1	Fundamental Subspaces, General Linear Mappings
2	Sept 17 - 21	8.2, 8.3	Rank-Nullity Theorem, Matrix of a Linear Mapping
3	Sept 24 - 28	8.4, 9.1	Isomorphisms, Inner Product Spaces
4	Oct 1 - 5	9.2, 9.3	Orthogonality, Orthogonal Matrix, Gram-Schmidt Procedure
5	Oct 10 - 12	9.4	Orthogonal Complements, General Projections
6	Oct 15 - 19	9.5, 9.6	Fundamental Theorem, Method of Least Squares
7	Oct 22 - 26	10.1, 10.2	Triangularization, Orthogonal Diagonalization
8	Oct 29 - Nov 2	10.2, 10.3	Orthogonal Diagonalization con't, Quadratic Forms
9	Nov 5 - 9	10.4, 10.5, 10.6	Graphs and Optimizing Quadratic Forms, Singular Values
10	Nov 12 - 16	10.6, 11.1	Singular Value Decomposition, Complex Numbers
11	Nov 19 - 23	11.2, 11.3, 11.4	Complex Vector Spaces, Eigenvalues, and Inner Products
12	Nov 26 - 30	11.4, 11.5	Conjugate Transpose, Unitary Diagonalization
13	Dec 3	11.6	Cayley-Hamilton Theorem

Text Book: Linear Algebra Course Notes by Dan Wolczuk. Available in the bookstore.

Grades: Final Exam: 65%; Midterm: 25%; Assignments 10%.

Tests: Midterm: Tuesday, Nov 6th, 4:30 - 6:20 pm
Final Exam : TBA

NOTE: Missed tests will count as 0 unless suitable medical documentation is provided.
There will not be any make-up tests.

Tutorials: The Monday tutorials will provide a recap of important topics and additional examples.

Assignments: Assignments are due on Wednesdays by 3:30 pm in the designated drop boxes in front of MC 4066/4067. It is your responsibility that you hand your assignment into the correct drop box. **Late assignments or assignments submitted to the wrong drop box will receive a grade of 0.** Your solutions should be legible and well-organized. Complete solutions will be posted on the LEARN website on Fridays. Note that the assignments will reflect our expectations as to the tests and final exam; however, it is strongly recommended that you do additional problems to ensure a solid understanding of the material. Unclaimed assignments/midterms will be shredded at the end of term.

Additional Help: Tutors will be available in the tutorial center (MC 4067) on Mondays and Tuesdays (times TBA). Your instructor will let you know when they are available to answer questions.

Calculators: Calculators will not be allowed on tests.

Academic Integrity: In order to maintain a culture of academic integrity, members of the University of Waterloo community are expected to promote honesty, trust, fairness, respect and responsibility.

[Check www.uwaterloo.ca/academicintegrity/ for more information.]

Grievance: A student who believes that a decision affecting some aspect of his/her university life has been unfair or unreasonable may have grounds for initiating a grievance. Read Policy 70, Student Petitions and Grievances, Section 4,

<http://www.adm.uwaterloo.ca/infosec/Policies/policy70.htm>.

When in doubt please be certain to contact the department's administrative assistant who will provide further assistance.

Discipline: A student is expected to know what constitutes academic integrity to avoid committing academic offenses and to take responsibility for his/her actions. A student who is unsure whether an action constitutes an offense, or who needs help in learning how to avoid offenses (e.g., plagiarism, cheating) or about "rules" for group work/collaboration should seek guidance from the course professor, academic adviser, or the undergraduate associate dean. For information on categories of offenses and types of penalties, students should refer to Policy 71, Student Discipline,

<http://www.adm.uwaterloo.ca/infosec/Policies/policy71.htm>.

For typical penalties check Guidelines for the Assessment of Penalties,

<http://www.adm.uwaterloo.ca/infosec/guidelines/penaltyguidelines.htm>.

Appeals: A decision made or penalty imposed under Policy 70, Student Petitions and Grievances (other than a petition) or Policy 71, Student Discipline may be appealed if there is a ground. A student who believes he/she has a ground for an appeal should refer to Policy 72, Student Appeals, <http://www.adm.uwaterloo.ca/infosec/Policies/policy72.htm>.

Note for students with disabilities: The Office for Persons with Disabilities (OPD), located in Needles Hall, Room 1132, collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with the OPD at the beginning of each academic term.