

Math 245 Linear Algebra II

Instructor: Kenneth Davidson

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Class times: MWF 9:30–10:20 in CPH 3604

Office hours: W 3:00–4:00 in MC 5080, or by appointment.

Website: www.math.uwaterloo.ca/~krdaids/M245.html

Textbook: S. Friedberg, A. Insel, and L. Spence, *Linear Algebra*, 4th ed., Pearson Publishing, 2002.

Good Alternative: K. Hoffman and R. Kunze, *Linear Algebra*, 2nd ed., Prentice Hall, 1971.

Course Outline

1. **Eigenvalues:** triangular forms, characteristic polynomial, Cayley-Hamilton theorem.
2. **Canonical forms:** diagonalization, Jordan form, primary decomposition.
3. **Inner product spaces:** orthonormal bases, normal matrices, spectral theorem, quadratic forms.
4. **Linear analysis:** duality, convexity, norms on matrices, singular values,

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| Grading | Homework | 20 % |
| | Midterm | 30 % |
| | Final Exam | 50 % |
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| | Total | 100 % |

Midterm time: Tuesday, November 6, 4:30–6:20.

Any student who misses the midterm for a legitimate reason (medical, or with prior permission) will be required to take a one hour make-up test which will be valued at 20%, and the final exam will be worth 60%.

Homework: There will be regular assignments. You are expected to hand in all assignments. Normally late assignments will not receive credit. Extensions may be granted in exceptional circumstances, but permission must be requested at least two days in advance.

Missed final exam: An incomplete (or in rare cases a makeup exam) is only an option if there is a legitimate reason for missing the exam (generally medical) and the term work is satisfactory.

The University Senate mandates that every course outline must contain the following text.

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 advisor, 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 grounds for an appeal should refer to *Policy 72, Student Appeals*,

<http://www.adm.uwaterloo.ca/infosec/Policies/policy72.htm>.

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.