Course Objective: Numerical linear algebra is a basic part of many problems in scientific computation. This course provides an overview of algorithms and uses numerical linear algebra techniques for solving application problems. The course is structured around four major topics:

1. solving special linear systems,
2. least squares problems,
3. eigenvalue problems and
4. singular value decomposition.

Students will study the concepts of matrix factorization, implement algorithms using MATLAB, and apply numerical linear algebra techniques to solve application problems.

Sources of Information: The main source of information for the course is the material posted on the Resources page of the unsecured website. Course material will consist of lecture notes and possibly additional explanations. You may also wish to consult one or more of the optional textbooks below.

Optional Texts:


Grading Scheme:

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marked Quizzes on LEARN</td>
<td>10%</td>
</tr>
<tr>
<td>Crowdmark Assignments</td>
<td>30%</td>
</tr>
<tr>
<td>Midterm Exam (2023-06-20, 16:30-18:20)</td>
<td>20%</td>
</tr>
<tr>
<td>Final Exam (will be scheduled by the Registrar)</td>
<td>40%</td>
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</tbody>
</table>

Notes:

1. You must pass the weighted average of the exam portion in order to pass the course.
2. If you miss the midterm or the final without a valid justification (an illness supported with a Verification of Illness Form, a death in your immediate family, etc.), you will receive a grade of 0 on the exam.

Rules for Group Work: All work is to be done individually. The penalty for plagiarism on assignments (first offense) is an assigned mark of 0 on the assignment and a 5% reduction of the final grade, consistent with School of Computer Science policy.

In addition, a letter detailing the offense is sent to the Associate Dean of Undergraduate Studies, meaning that subsequent offences will carry more severe penalties, up to suspension or expulsion.
Do not look in other books on the subject for help, do not ask your friends (and do not discuss assignments outside of broad ideas). It is not worth it: if you do not know how to answer a question, come talk to the instructor. I am paid to help you.

**Crowdmark Assignments:** There will be assignments, posted approximately biweekly, due in Crowdmark. For details, refer to the unsecured course website.

**Marked Quizzes:** There will be marked quizzes posted on the LEARN site, due in the weeks when no Crowdmark assignment or mid-term exam will be due. For details, refer to the unsecured course website.

**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 [http://www.uwaterloo.ca/academicintegrity/](http://www.uwaterloo.ca/academicintegrity/) for more information.

**Grievances:** 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](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](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](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](http://www.adm.uwaterloo.ca/infosec/Policies/policy72.htm).

**Note for students with disabilities:** AccessAbility Services, [https://uwaterloo.ca/accessability-services/](https://uwaterloo.ca/accessability-services/), 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 AccessAbility Services at the beginning of each academic term.