MATH-1350H-R: Linear Algebra I
2025WI - Peterborough Campus

Instructor:

Instructor: John Talboom

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Phone Number: 705-748-1011 x7284

Office: ENW-333

Office Hours: Wednesday 2:00 PM - 3:00 PM

Meeting Times:

Lectures:

- Wednesday 13:00 - 13:50 online (Zoom live lecture)
- Friday 13:00 - 14:50 in CCS 307

See individual undergraduate timetable for your weekly one-hour seminar/workshop.

Please refer to the academic timetable on myTrent for up-to-date scheduling information, as these times and locations may change.

Feel free to email me with any questions about the course, or about course content and I will do my best to give you a prompt reply. You are expected to attend all lectures, seminars and labs your are registered in. If you are unable to attend the regularly scheduled office hours, and you would like to meet, please send me an email and we can look into setting up an alternate time. Everything you should need for the course can be found on Blackboard.

Co-instructors and Teaching Assistants:

TBA

Department:

Academic Administrative Assistant: Colleen Berrigan

Email Address: math@trentu.ca

Phone Number: 7715

Office: SC327

Description:

Vectors, systems of linear equations, matrices, determinants, vector spaces and subspaces, linear transformations, eigenvalues and eigenvectors.

Learning Outcomes:

By the end of the course a successful student should:

1. Solve systems of linear equations using the Gauss-Jordan elimination method.
2. Perform matrix calculations and matrix algebra.
3. Compute the determinant of a matrix.
4. Have an understanding of Rn as a vector space.
5. Find bases for vector spaces and subspaces.
6. Investigate linear transformations on Rn.
7. Find eigenvalues and eigenvectors for a matrix.

Readings:

David Poole, *Linear Algebra: A Modern Introduction (Fourth Edition),* Cengage Learning, 2015. ISBN: 978-1-285-46324-2.

Cost: $105.74 to $251.75 from Trent Bookstore (subject to change).

Textbook is optional, as notes and supplemental exercises will be posted, however, extra homework problems (not for marks) from the textbook will be assigned. The textbook is also a useful reference and students may find the examples and explanations therein to be interesting and helpful.

Assessments, Assignments and Tests:

- Mini-Assignments: 10, worth 25% of final grade.
    - Dates: **Posted on Blackboard** weekly on Thursday evenings and due on the next Monday. First assignment posted on January 16, last one on March 27 (no Mini-Assignment during reading week).
    - Description: Multiple-choice/short answer, completed through Blackboard.
- Term Tests: 4, 50 minutes each, worth 40% of final grade.
    - Dates: January 21, February 11, March 4 and March 18, **written in individual seminar/workshop period.**
    - Description: Individually written test with a variety of long/short answer questions and some multiple choice.
- Final Exam: 1, 3 hour closed book exam **in person**, worth 35% of final grade.
    - Exam period: April 7 - 23.
    - Description: Individually written test with a variety of long/short answer questions and some multiple choice.

To receive full marks, solutions must be well presented with work/steps shown unless otherwise stated.

Grading:

- Mini-Assignments: 10, worth 25% of final grade.
- Tests: 4, worth 40% of final grade.
- Final exam: 1, worth 35% of final grade.

25%+40%+35%=100%

Grade Total by Withdrawal Date:

At least 25% of the course mark will be provided by the final date (March 7, 2025) to withdraw from the course without academic penalty.

Schedule:

Below is a schedule of topics by week with textbook reference to the lecture notes and the textbook (note that the order of topics in the lecture notes is different from the textbook) and is subject to change as needed. This schedule is meant as a guide to keep you on track with the lectures and to prepare for the term tests and assignments.

- Week 1: January 8 and 10
  - Introduction to linear algebra, solving systems of equations with Gauss' method
  - Textbook sections: 2.0-2.2
- Week 2: January 15 and 17
  - Matrices and describing the solution set.
  - Gauss-Jordan reduction
  - Textbook sections: 2.0-2.2
- Week 3: January 22 and 24
  - Matrix operations
  - Matrix inverses
  - Textbook sections: 3.0-2
- Week 4: January 29 and 31
  - Elementary matrices
  - LU decomposition
  - Textbook sections: 3.0-4
- Week 5: February 5 and 7
  - Introduction to determinants, Gauss' method
  - Laplace expansion
  - Textbook sections: 4.2
- Week 6: February 12 and 14
  - Laplace expansion
  - Cramer's Rule
  - Textbook section: 4.2
- Winter reading break: February 17-21 (no classes)

- Week 7: February 26 and 28
    - Vectors in space, length and angle
    - Equations of lines and planes
    - Textbook sections: 1.0-3
- Week 8: March 5 and 7
    - Vector spaces and subspaces
    - Textbook sections: 3.5
- Week 9: March 12 and 14
    - Spanning sets and linear independence
    - Basis and dimension
    - Textbook section: 3.5
- Week 10: March 19 and 21
    - The rank of a matrix
    - Textbook section: 3.5
- Week 11: March 26 and 28
    - Linear transformations
    - Matrices and linear transformations
    - Kernel and image
    - Textbook sections: 3.6
- Week 12: April 2 and 4
    - Eigenvalues and eigenvectors
    - Diagonalization
    - Textbook section: 4.0-4

Course Guidelines:

Students are expected to log in to Blackboard regularly to access course materials, and read email announcements. It is the student's responsibility to be aware of all dates and deadlines. There will be no late/early writing of tests, or make up tests. Any missed tests or assignments will receive a grade of zero (exceptions may be made for extenuating circumstances). Students are advised to discuss necessary accommodations with SAS and/or their academic adviser.

Be advised that the final day for withdrawal is March 7, 2025.

University Policies:

Academic Integrity

Academic dishonesty, which includes plagiarism and cheating, is an extremely serious academic offence and carries penalties varying from failure on an assignment to expulsion from the University. Definitions, penalties, and procedures for dealing with plagiarism and cheating are set out in Trent University's *Academic Integrity Policy*. You have a responsibility to educate yourself – unfamiliarity with the policy is not an excuse. You are strongly encouraged to visit Trent's Academic Integrity website to learn more: www.trentu.ca/academicintegrity.

Access to Instruction

It is Trent University's intent to create an inclusive learning environment. If a student has a disability and documentation from a regulated health care practitioner and feels that they may need accommodations to succeed in a course, the student should contact the Student Accessibility Services Office (SAS) at the respective campus as soon as possible.

Sharing and Distribution of Course Content

Students in this class should be aware that classroom activities (lecture, seminars, labs, etc.) may be recorded for teaching and learning purposes. Any students with concerns about being recorded in a classroom context should speak with their professor. If a student shares or distributes course content in any way that breaches copyright legislation, privacy legislation, and/or this policy, the student will be subject to disciplinary actions under the relevant Academic Integrity Policy, the Charter of Student Rights & Responsibilities, or the Policy on the Protection of Personal Information, at a minimum, and may be subject to legal consequences that are outside of the responsibility of the university.

Student Absenteeism, Missed Tests and Examinations

Students are responsible for completing all course requirements, including attending classes and meeting assignment deadlines as specified on their syllabus.

Adjustments and deferrals to dates for participation, assignment submissions, tests, midterms and final examinations are not automatic. It is the student's responsibility to email their instructor immediately if they are unable to fulfill academic requirements.

Courses delivered remotely may involve student participation in scheduled (synchronous) classes via web-based platforms, such as Zoom. Students unable to participate (i.e., by video and/or audio) should email their instructors to request alternative arrangements for participation in these scheduled (synchronous) classes.

Students are required to be available for all tests, midterms and exams that are listed in their course syllabus and scheduled by their instructor or the Office of the Registrar. Depending on their program, the instructor or the chair/director may decide on alternative arrangements for exams and tests. Normally a doctor's note or supporting documentation is not required; however, when a student's success in the course or program is in jeopardy as determined by the instructor or chair/director, documentation may be requested.

Specific SAS accommodations can be implemented for students registered with Student Accessibility Services (SAS), but it is the responsibility of the student to make these arrangements in advance as per SAS guidelines, and to discuss accommodations of due dates with their instructors.

Students can notify the Office of the Registrar of their wish to observe cultural or religious holidays during scheduled examination periods by the deadline set in the Academic Calendar. Personal travel plans are not acceptable reasons for missing tests or exams.

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