Math 152 Linear Systems

Common Website (All Sections)

OVERVIEW

The course concerns linear algebra concepts, stressing their application and their connection to geometry. For more detailed information, see the common course web page.

Text: There is no commercial texbook for this course. We will follow these online notes (written by UBC professors Richard Froese and Brian Wetton). The book "Linear Algebra and Its Applications" by David C. Lay is designated as an optional reference book.

Common course web page: http://www.math.ubc.ca/~oyilmaz/courses/m152/m152_common.html

GRADING

Your grade for the course will be computed as follows:
Final: 45%
Two Midterms: 15% each
Online Homework: 10%
Labs: 10%
Other assignments/quizzes: 5%

Midterm exams

There will be **two midterm** exams, held in class:

Midterm 1: Wednesday, February 6 for MWF sections
Thursday, February 7 for Tue/Th sections
Midterm 2: Tuesday, March 19 for Tue/Th sections
Wednesday, March 20 for MWF sections

The midterm exams will be **common**, different for MWF sections and Tue/Th sections.

The midterm exams will be strictly closed book: **no books, notes, formula sheets or calculators will be allowed.**

Missing a midterm normally results in a mark of 0. Exceptions may be granted in two cases: prior consent of the instructor or a medical emergency. In the latter case, the instructor must be notified within 48 hours of the missed test, and presented with a doctor's note immediately upon the student's return to UBC. **In such cases, there will be no make-up exam.** Instead, the final exam mark will be adjusted to make up for the missed midterm mark.

Online homework

Online homework for the course will be provided via the **WeBWorK** system. The assignments will be posted at:
https://webwork.elearning.ubc.ca/webwork2/MATH_152_ALL_2012W2/
where you need log in using your CWL. Here are some important points:

- There will be one assignment posted per week, each due on the following Monday at 8:00 AM, with the **first assignment due on Monday, January 14 at 8:00 AM**.
- Questions specifically about the the online system may be addressed to Tobias Friedel: **tobias-at-math.ubc.ca**.
- Make sure you go over the "Assignment 0" (not for credit) which teaches you how to use the online homework system WeBWorK. Note that:
  - You may attempt each question many times without a penalty for a wrong answer up to a certain maximum allowed number of trials (possibly unlimited), specified for each problem. This gives you instant feedback on your attempts and an opportunity to correct your own mistakes.
  - The questions are generated randomly, and the numbers are different for each student.
  - Do the problems by yourself and without the use of other calculators (WeBWorK software itself acts as a basic

calculator) or software. Note that calculators and software are not allowed in the exams, so you should practice working without them.
- If you really get stuck, you can request help by clicking the "email instructor" button. However, it may take some time to get a response, so please don't wait till the last minute.
- Note that the deadlines are imposed by the system, so make sure you give yourself plenty of extra time. There will be no deadline extension and no make-up for missed online homework assignments.

Labs
You will be responsible for completing six one hour computer labs using the software, MATLAB. There are no labs during the first week of classes. You will do labs on alternating weeks starting in week 2 or 3. Note that lab material may be tested in the midterms and in the final exam. For more information about labs, see the course lab web page: http://www.ugrad.math.ubc.ca/~math152/

Other assignments / quizzes
The nature of these additional assignments or quizzes will be section-specific. Please see the web page of the section that you are registered in.

Final Exam
There is a common final exam for all sections of Math 152. The exam will be strictly closed book: **no books, notes, formula sheets or calculators will be allowed.**

DETAILED COURSE OUTLINE

All sections of MATH 152 will cover the topics listed below. Here a "week" represents approximately 150 minutes of class time, not necessarily a calendar week.
week #1 vectors and coordinate representation; vector length, dot product, projection
week #2 determinants; cross product; lines and planes in 2D and 3D and planes in 3D;
week #3 geometry of solutions of linear systems; linear dependence and independence; solving linear systems;
week #4 solving linear systems (cont.); echelon form and rank; homogeneous equations and relationship to linear dependence;
week #5 resistor networks; review
week #6 Test #1; matrix multiplication; linear transformations; rotations, projections and reflections in 2D;
week #7 matrix representation and composition of linear transformations; random walks; transpose;
week #8 matrix inverse; matrix representation of resistor network problems; determinants;
week #9 determinants (cont.); complex numbers; complex linear systems;
week #10 eigenvalues and eigenvectors, review, Test #2
week #11 eigenvalues and eigenvectors (ctd); powers of a matrix; application of eigen-analysis to random walks;
week #12 vector differential equations; application of vector DEs to electrical networks

CALENDAR

Wed, Jan 2	Term starts
Wed, Feb 6 / Th, Feb 7	**Midterm 1**
Mon, Feb 11	Family Day (university is closed)
Feb 18-22	Winter break
Tue, Mar 19 / Wed Mar 20	**Midterm 2**
Fr, Mar 29	Good Friday (university is closed)
Mon, Apr 1	Easter Monday (university is closed)
Fr, Apr 5	Last day of classes
TBA	Final Exam