Math 307

Applied Linear Algebra

INSTRUCTOR INFORMATION

Instructor: [Ozgur Yilmaz](#)
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Office: Math Annex 1113
Office Hours: By appointment
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COURSE INFORMATION

Section: 101

Class times and location:

Day	Start Time	End Time	Building	Room
MWF	13:00	14:00	Chem	[C124](#)

Course web page: http://www.math.ubc.ca/~oyilmaz/courses/m307/m307.html will be updated throughout the term.

Pre-requisite: One of MATH 152, MATH 221, MATH 223 and one of MATH 200, MATH 217, MATH 226, MATH 253, MATH 263.

COURSE OUTLINE

This course is organized around a collection of interesting applications. Examples from past years are:

Interpolation
Finite difference approximations
Formula matrix of a chemical system
Least Squares
Fourier series
Graphs and Networks
FFT
JPEG compression
Power method
Recursion relations
The Anderson tight binding model
Markov chains
Google PageRank

We will study a selection of these in this class. Each application will be preceded by discussion of the relevant concepts from Linear Algebra. These will be partly review from your previous linear algebra course and partly new material. You will also learn how to do Linear Algebra on a computer using MATLAB or Octave.

Learning Goals: [See here](#) for a detailed list of prerequisites and learning goals of Math 307.

Text: There is no required textbook for this course. Instead there is a set of typed notes designed for this course, which is available here:

Computational aspects: To complete the work for this course, you will need access to MATLAB software. MATLAB is a widely used program for numerical computations with matrices. You can access MATLAB in the math department computer labs. These are located in LSK 121 and 310. The labs hours are posted here. You may use any free terminal in the labs during these times. Your username and password will be given out in class. Please contact me if you have difficulty logging in. Student versions of MATLAB are also available (although quite expensive). If you prefer, you may also use GNU Octave, which is an open source MATLAB clone that is available for free. It is included in most Linux distributions. Windows and Mac versions are available for free download. However, the professor will only be able to answer questions regarding MATLAB.

Grades

Homework: There will be weekly written homework assignments, due at the beginning of class each Wednesday. These assignments will be posted below.

WeBWork: There will also be webwork assignments with a schedule to be determined.

Late homework will not be accepted. However, your lowest (written) homework score will be dropped (so you can miss one homework if necessary). Nevertheless, even if you miss a deadline, its a good idea to do the problems, since this is the best way to prepare for the tests and exam. You are welcome to discuss the homework problems with your friends, but are expected to hand in your own work.

There will one **midterm** exam on **Wednesday, October 26** in class. Note that the final exam date is currently unavailable, but will be released during the term. Do not make end-of-term travel plans until this date has been fixed.

You will not be permitted to bring calculators to the test and exam.

Missing a homework or 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. Failure to comply results in a 0 mark. If a midterm was missed for legitimate reasons, the weight of the missed midterm will be transferred to the final. Make-up midterms will, in general, not be provided.

Your grade for the course will be computed roughly as follows:

Homework: 10%
WebWork: 5%
Midterm: 35%
Final exam: 50%

Resources

- **Piazza:** You may find Piazza a useful resource for all class-related questions and discussion. Piazza is a question-and-answer platform specifically designed to expedite answers to your questions, using the collective knowledge of your classmates and instructor. It has several features that facilitate discussion of mathematics, most notably support of mathematical typesetting (LaTeX). You are encouraged to answer your classmates' questions, or to brainstorm towards answers, every bit as much as you are encouraged to ask questions. Here are the links:

- Piazza Signup link .
- Piazza Class link.

You will need a UBC email address to sign up for Piazza.

- **Math Learning Center:** The Math Learning Centre (MLC) is a space for undergraduate students to study math together, with support from math tutors, who are graduate students in the math department. Please note that while students are encouraged to seek help with homework, the MLC is not a place to check answers or receive solutions, rather, its aim is aid students in becoming expert learners; to develop critical thinking and skills in a mathematical setting.

If you need help, or would like to discuss any aspect of this course, please make an appointment to see me in my office.

Calendar

Wednesday, Sep 7	First lecture
Monday, Oct 10	Thanksgiving day -- university closed.
Wednesday, Oct 26	**Midterm**
Friday, Nov 11	Remembrance Day -- university closed.
Friday, Dec 2	Last lecture
Tue, Dec 6	Examinations begin...
TBA	Final exam