MAT240H1F **2015**
Kudla **Fall**

Algebra I
Course Information

This course will provide a theoretical approach to linear algebra over an arbitrary field. Topics will include:

- fields, vector spaces, subspaces, bases and dimension,
- linear transformations, matrices, change of basis, similarity,
- systems of linear equations, determinants.
- eigenvalues, eigenvectors, characteristic polynomial, diagonalization.

The treatment will be rigorous, including proofs of most important results. Thus, the course is aimed at students who intend to become specialists in mathematics, applied mathematics, and other areas requiring a deeper theoretical understanding of this subject. A parallel course, with less emphasis on theory and proofs, is **MAT223**. The webpage:

http://www.artsandscience.utoronto.ca/ofr/calendar/crs_mat.htm

should be consulted as needed concerning the correct choice.

Here is a more detailed description of the material to be covered in **MAT240**.

Text:
Friedberg, Insel and Spence, *Linear Algebra*, 4th edition, Prentice Hall.

Topics:
The main topics covered by this course are the following:

I. Fields, vector spaces, subspaces, bases, dimension.
Chapter 1: sections 1.1–1.6
II. Linear transformations, null space and range, isomorphisms, matrix representations, matrix multiplication, change of basis.
Chapter 2: sections 2.1–2.5.
III. Elementary matrix operations, rank, inverse matrices, systems of linear equations.
Chapter 3: sections 3.1–3.4.
IV. Determinants, cofactor expansions, properties of determinants.
Chapter 4: sections 4.1–4.4.
V. Eigenvectors and eigenvalues, characteristic polynomial, diagonalization.
Chapter 5: 5.1–5.2.

Lectures: Monday 9-10 and **Wednesday 9-11** in MB 128.

Tutorials: The tutorials will begin the first week of classes.
There will be four tutorial sections:

I: Thursday 10–11
II: Thursday 11–12

III: Friday 10–11
IV: Friday 11–12

Further details about the tutorials will be given in a later version of this syllabus.

Marking Scheme: The course grade will be computed on the basis of 600 points:
Final Exam: 300 points
Midterm Exam: 200 points
Homework: 100 points

Term Test: The Midterm Test will take place on **Wednesday, Oct 21st** in our regular lecture room. More details about the test will be provided as the time approaches.

Note: There will be **no** makeup midterms! If you miss the midterm and you do not provide a valid reason (e.g., a doctor's note) within 1 week of the test, the test grade will be counted as 0. If you provide a valid reason within one week, the corresponding portion of the final examination will be counted as your midterm score.

Homework: Homework assignments will be posted on Blackboard on Monday afternoon and will be due in class the following Monday. **No late homework will be accepted.** A homework assignment not handed in will be counted as a 0. The lowest homework score will be dropped and the remaining scores will be averaged.

Academic Integrity: The homework assignments you turn in should be your own solutions to the given problems. Solutions copied from other sources, the internet, a friend's solutions, etc., are not acceptable. Please consult the webpage:

http://www.artsci.utoronto.ca/osai/The-rules/what-is-academic-misconduct

concerning the university policies on academic integrity.

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