



Course Outline

UNIVERSITY STUDIES

MATH 102A
Applied Linear Algebra
Winter 2013

3 CREDITS
4 HOURS PER WEEK

INSTRUCTOR: Matthew Morin

Instructor Information

Name: Matthew Morin
Phone Number: 780-791-4831
Email: matthew.morin@keyano.ca
Office Number: S211E
Office Hours: Monday: 14:00 - 14:50
Tuesday: 14:00 - 14:50
Wednesday: 14:00 - 14:50
Thursday: 14:00 - 14:50
Friday: 14:00 - 14:50

Hours of Instruction

Mondays	08:00 - 08:50	Room 105	(Lab)
	12:00 - 12:50	Room 233	(Lecture)
Wednesday	08:00 - 08:50	Room 233	(Lecture)
Friday	13:00 - 13:50	Room 224	(Lecture)

Course Description

This course covers vector and matrix algebra, systems of linear equations, vector geometry in the plane and in space, determinants, orthogonality and applications, eigenvalues and eigenvectors with applications, complex vector spaces.

Prerequisites

Math 31 or equivalent.

Required/Recommended Resources

Textbook: Elementary Linear Algebra; Howard Anton (10th edition).

Moodle: Course information will be available through Moodle.

<http://ilearn.keyano.ca>

Course Outcomes

The student will be able to:

1. Demonstrate an ability to use vectors and matrices to model geometry, equations, and other concepts.
2. Master the fundamentals of matrix operations and algebra.

3. Determine the spaces associated with a matrix (row space, column space, null space, eigenspace).
4. Determine a basis for a given space/subspace.

Evaluation

Assignments	10%
Midterm Exam 1	20%
Midterm Exam 2	20%
Final Examination	50%
Total:	100%

Assignments

In any mathematics course *the best way “to learn” is “to do.”* The instructor can teach you about the course ideas and demonstrate the mechanics of solving the problems (and can make it look very easy), but in order to grow adept at solving these problems take a lot of practice (and can at times be a struggle). Although the assignments may not count for much of your final grade *they are essential in preparing you for the types of problems you will be expected to solve on the tests.*

Problems from the textbook will be assigned and collected on an approximately week-by-week basis. Each of the assignments will be weighted equally. Students are responsible to pay attention in-class or check Moodle often to keep apprised of the due dates of these assignments.

Tests

Tests will be written and are closed-book. Calculators should not be required and will not be allowed. The topics covered by each test will be described in-class and will be posted on Moodle.

Grading System

Standing	Letter Grade	Grade Points
Excellent	A+	4.0
	A	4.0
	A-	3.7
Good	B+	3.3
	B	3.0
	B-	2.7
Satisfactory	C+	2.3
	C	2.0
	C-	1.7
Poor	D+	1.3
Min Pass	D	1.0
Failure	F	0.0

Performance Requirements

Student Attendance

Class attendance is essential for two reasons. First, class attendance is the primary way that we, as instructors, can facilitate a student's learning experience. Second, attending class is a good way to keep informed of matters relating to the administration of the course (e.g., the timing of assignments and exams). Ultimately, you are responsible for your own learning and performance in this course.

As is stated in the *Student Rights and Responsibilities* section of the Credit Calendar, **"Excessive or inexcusable absences can result in a poor or failing grade, loss or reduction of sponsor allowances, and/or probation or suspension."**

Student Preparation

It is the responsibility of each student to be prepared for all classes. To get the most out of the classroom experience, students should have read the appropriate section of the textbook prior to the class that it is covered.

Students who miss classes are responsible for the material covered in those classes and for ensuring that they are prepared for the next class, including the completion of any assignments and/or readings that may be due.

Plagiarism and Cheating

Every student expects to be treated and evaluated fairly in a course. Plagiarism and cheating robs everyone of this right.

No student may submit words, ideas or data of another student or person as his or her own in any writing, project, assignment, quiz, electronic presentation, exam etc. Any work used that is not the student's own must be clearly cited as belonging to someone else. There are penalties for using other's work and not citing it. The Student's Rights & Responsibilities document clearly outlines these penalties and the appeal process.

- No learner can obtain information from another student during an exam.
- No learner can bring unauthorized information (paper or electronic) into an exam or quiz.
- No student can submit work done in another course for grading in this course without the written prior approval of the course instructor.
- No student can submit copyright protected or commercially produced materials as part or all of an assignment without proper citation & permission.

COLLEGE POLICIES

Equality, Equity and Respect

The Keyano College is committed to providing an environment of equality, equity and respect for all people within the College community. All members of this community are considered partners in developing teaching and learning contexts that are welcoming to all. Faculty, staff, and students are encouraged to use inclusive language to create a classroom atmosphere in which students' experiences and views are treated with equal respect and valued in relation to their gender, ethnic and cultural background, and sexual orientation.

Students should consult:

http://www.keyano.ca/Committees/IRA/Individual_Rights_Policy.asp

Accommodation for Students with Disabilities

Disability Support Services: Learner Assistance Program

If you have a documented disability or you think that you would benefit from some assistance from a Disabilities Counsellor, please call or visit the Disability Supports Office 780-792-5608 to book an appointment (across from the library). Services and accommodations are intended to assist you in your program of study, while maintaining the academic standards of Keyano College. We can be of assistance to you in disclosing your disability to your instructor, providing accommodations, and supporting your overall success at Keyano College.

Specialized Supports and Duty to Accommodate

Specialized Support and Duty to Accommodate are aligned with the office of Disability Support Services: Learner Assistance Program (LAP) guided by federal and provincial human rights legislation, and defined by a number of Keyano College policies. Keyano College is obligated by legislation to provide disability-related accommodations to students with identified disabilities to the point of undue hardship.

APPROXIMATE COURSE SCHEDULE

Week	Dates	Topic	Chapter Sections
1	Jan. 7—Jan. 11	Introduction, Matrix Operations	1.1, 1.2, 1.,3
2	Jan. 14—Jan. 18	Matrix Algebra, Inverses	1.4, 1.5, 1.6
3	Jan. 21—Jan. 25	Special Matrices, Determinants	1.7, 2.1, 2.2
4	Jan. 28—Feb. 1	Cramer's Rule, Euclidean Space	2.3, 3.1, 3.2
5	Feb. 4—Feb. 8	Dot Product, Cross Product, Geometry	3.3, 3.4, 3.5
6	Feb. 11—Feb. 15	Midterm 1 , Vector Spaces, Subspaces	4.1, 4.2
7	Feb. 18—Feb. 22	Family Day , Independence, Coordinates	4.3, 4.4
	Feb. 25—Mar. 1	Reading Week	
8	Mar. 4—Mar. 8	Dimension, Change of Basis, The Fundamental Spaces of a Matrix	4.5, 4.6, 4.7
9	Mar. 11—Mar. 15	Rank Equation, Matrix Transformations	4.8, 4.9, 4.10
10	Mar. 18—Mar. 22	Eigenvalues and Eigenvectors, Diagonalization	5.1, 5.2, 5.3
11	Mar. 25—Mar. 29	Good Friday , Inner Products, Orthogonality	6.1, 6.2
12	Apr. 1—Apr. 5	Easter Monday, Midterm 2 , Gram-Schmidt Process	6.3
13	Apr. 8—Apr. 12	Orthogonal Matrices, Orthogonal Diagonalization, Linear Transformations	7.1, 7.2, 8.1
14	Apr. 15—Apr. 19	Isomorphism, Compositions and Inverse Transformations, Matrix Representations	8.2, 8.3, 8.4
	Apr. 22—Apr. 30	Exam Period	

Please Note: This course outline may be modified to facilitate unforeseen time constraints. Date and time allotted to each topic is subject to change.

IMPORTANT DATES TO REMEMBER

Jan. 7	Winter Semester Begins
Jan. 11	Last day to add classes, Winter Semester Fees due
Jan. 18	Last day to drop for academic programs Last day to withdraw from full year courses without academic penalty
Feb. 15	Last day to withdraw with a 50% refund
Feb. 18	<i>College Closed</i> (Family Day)
Feb. 25 - Mar. 1	<i>Reading Week</i> (No Classes for academic programs)
March 8	Last day to withdraw without academic penalty
March 29	<i>College Closed</i> (Good Friday)
April 1	<i>College Closed</i> (Easter Monday)
April 19	Last day of classes
April 22 - 30	FINAL EXAM PERIOD.

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Matthew Morin, Instructor

Date

Reviewed and approved by:

Louis Dingley, Chairperson

Date

Guy Harmer, Dean

Date