



DEPARTMENT OF SCIENCE

COURSE OUTLINE – WINTER 2017

MA2250 (A3): Linear Algebra II – 3 (3-1-0) UT 15 Weeks, 60 Hours

INSTRUCTOR: Dr. Brian Redmond **PHONE:** 780-539-2093
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OFFICE HOURS: TBA

CALENDAR DESCRIPTION: Vector spaces; inner product spaces; examples of n -space and the space of continuous functions. GramSchmidt process, QR-factorization of a matrix and least squares. Linear transformations, change of basis, similarity and diagonalization. Orthogonal diagonalization, quadratic forms. Applications in a variety of fields, numerical methods.

PREREQUISITE(S)/COREQUISITE: MA1020 or MA1200, and Mathematics 31 or 1000-level Calculus course

REQUIRED TEXT/RESOURCE MATERIALS: W. Keith Nicholson, Linear Algebra with Applications 7E, McGraw-Hill Ryerson 2013.

DELIVERY MODE(S): This is a lecture based course.

COURSE OBJECTIVES: The primary purpose of this second semester course in Linear Algebra is to present the subject in a unifying and rigorous way using the fundamental principles of abstract vector spaces the linear transformations between them. Thus the course includes \mathbb{R}^n , abstract vector spaces, linear transformations (and their matrices), orthogonality, and complex matrices. Finally, the power of the subject will be illustrated through a variety of applications.

LEARNING OUTCOMES:

After successful completion of the course, students will have a solid understanding of the basic concepts of Linear Algebra and its applications. This includes the notions of abstract vector spaces and linear transformations, spanning sets and linear independence, basis and dimension, orthogonality and inner product spaces.

Specific computational outcomes include:

- Finding the least-squares solution of a system of equations
- The algebra of complex numbers and matrices
- Computing (complex) eigenvalues and eigenvectors
- The Gram-Schmidt orthogonalization algorithm
- QR-factorization
- Orthogonal diagonalization
- Finding the matrix of a linear transformation and change of bases

Other computational tasks are taken from the applications and may include: Lagrange polynomials, quadratic forms, least-squares regression, Fourier approximation, data compression using singular-value decomposition, linear codes over finite fields, linear recurrences, as well as some calculus-based applications.

TRANSFERABILITY:

University of Alberta, University of Calgary, University of Lethbridge, Athabasca University, Augustana Faculty, University of Alberta, Grant MacEwan University, King's University College

***Warning:** Although we strive to make the transferability information in this document up-to-date and accurate, **the student has the final responsibility for ensuring the transferability of this course to Alberta Colleges and Universities.** Please consult the Alberta Transfer Guide for more information. You may check to ensure the transferability of this course at Alberta Transfer Guide main page <http://www.transferalberta.ca> or, if you do not want to navigate through few links, at <http://alis.alberta.ca/ps/tsp/ta/tbi/onlineSearch.html?SearchMode=S&step=2>

**** Grade of D or D+ may not be acceptable for transfer to other post-secondary institutions. Students are cautioned that it is their responsibility to contact the receiving institutions to ensure transferability**

EVALUATIONS:

Assignments: 12.5%

Quizzes: 12.5%

Midterm: 25%

Final: 50%

GRADING CRITERIA:

Please note that most universities will not accept your course for transfer credit **IF** your grade is **less than C-**.

Alpha Grade	4-point Equivalent	Percentage Guidelines		Alpha Grade	4-point Equivalent	Percentage Guidelines
A+	4.0	95-100		C+	2.3	66-69
A	4.0	90-94		C	2.0	62-65
A-	3.7	85-89		C-	1.7	58-61
B+	3.3	80-84		D+	1.3	55-57
B	3.0	75-79		D	1.0	50-54
B-	2.7	70-74		F	0.0	00-49

COURSE SCHEDULE/TENTATIVE TIMELINE:

Week 1	Jan. 6	Fri. Jan. 6 first day of class
Week 2	Jan. 9-13	
Week 3	Jan. 16-20	
Week 4	Jan. 23-27	
Week 5	Jan. 30-Feb. 3	
Week 6	Feb. 6-10	
Week 7	Feb. 13-17	
Week 8	Feb. 20-24	Winter Break
Week 9	Feb. 27-Mar. 3	Wed. Mar. 1 – Midterm Exam
Week 10	Mar. 6-10	Tues. Mar. 7 last day to withdraw
Week 11	Mar. 13-17	
Week 12	Mar. 20-24	
Week 13	Mar. 27-31	
Week 14	Apr. 3-7	
Week 15	Apr.10-14	Wed. Apr. 12 last day of class
Final Exam Period	Apr. 17-27	

STUDENT RESPONSIBILITIES: Regular attendance and participation (including homework) is required for the successful completion of this course. Assignments must be handed in on time, and tests/exams must be written on the days announced in class. If an emergency prevents a student from writing a test/exam on the scheduled day, the student must contact the instructor immediately to make other arrangements. Otherwise, the student will receive a zero grade for that component of the course.

STATEMENT ON PLAGIARISM AND CHEATING:

Cheating and plagiarism will not be tolerated and there will be penalties. For a more precise definition of plagiarism and its consequences, refer to the Student Conduct section of the College Calendar at <http://www.gprc.ab.ca/programs/calendar/> or the College Policy on Student Misconduct: Plagiarism and Cheating at <https://www.gprc.ab.ca/about/administration/policies>

**Note: all Academic and Administrative policies are available on the same page