GPRC

DEPARTMENT OF SCIENCE

COURSE OUTLINE – WINTER 2020

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

INSTRUCTOR:	Tom McLeister	**PHONE:**	780-539-2961
OFFICE:	J212	**E-MAIL:**	tmcleister@gprc.ab.ca
OFFICE HOURS:	MTRF 10:00—11:20		

CALENDAR DESCRIPTION: Vector spaces; inner product spaces; examples of n-space and the space of continuous functions. Gram-Schmidt 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 (free pdf available at: www.lyryx.com)

DELIVERY MODE(S):	Lecture:	A3	M	11:30-12:50	J226
	Lecture	A3	F	10:00-11:20	J226
	Seminar:	A3	F	11:30-12:20	J228

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: Please consult the Alberta Transfer Guide for more information (www.transferalberta.alberta.ca)
** 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	90-100		C+	2.3	67-69
A	4.0	85-89		C	2.0	63-66
A-	3.7	80-84		C-	1.7	60-62
B+	3.3	77-79		D+	1.3	55-59
B	3.0	73-76		D	1.0	50-54
B-	2.7	70-72		F	0.0	00-49

COURSE SCHEDULE/TENTATIVE TIMELINE:
Week 1	Jan. 6-10	January 6 -- first day of classes
Week 2	Jan. 13-17	
Week 3	Jan. 20-24	
Week 4	Jan. 27-31	
Week 5	Feb. 3-Feb. 7	
Week 6	Feb. 10-14	
Week 7	Feb. 17-21	Winter Break (no classes)
Week 8	Feb. 24-28	Fri Feb 28—Midterm Exam
Week 9	Mar. 2-6	March 5 -- last day to withdraw
Week 10	Mar. 9-13	
Week 11	Mar. 16-20	
Week 12	Mar. 23-27	
Week 13	Mar. 30-Apr. 3	
Week 14	Apr. 6-10	April 10 -- Good Friday (college closed)
Week 15	Apr.13	April 12 -- last day of classes
Final Exam Period	Apr. 15-25	

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