NORTHWESTERN POLYTECHNIC

DEPARTMENT OF SCIENCE

COURSE OUTLINE – WINTER 2025

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

Northwestern Polytechnic acknowledges that our campuses are located on Treaty 8 territory, the ancestral and present-day home to many diverse First Nations, Metis, and Inuit people. We are grateful to work, live and learn on the traditional territory of Duncan's First Nation, Horse Lake First Nation and Sturgeon Lake Cree Nation, who are the original caretakers of this land.

We acknowledge the history of this land and we are thankful for the opportunity to walk together in friendship, where we will encourage and promote positive change for present and future generations.

INSTRUCTOR:	Tom McLeister	**PHONE:**	780-539-2961
OFFICE:	J212	**E-MAIL:**	tmcleister@nwpolytech.ca
OFFICE HOURS:	T 13:00—14:00 WR 10:00—11:00		

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: One of MA1020 or MA1200, and one of MA1000 or MA1130.

REQUIRED TEXT/RESOURCE MATERIALS:
W. Keith Nicholson, Linear Algebra with Applications (free pdf available at: www.lyryx.com)

DELIVERY MODE(S):

Lecture:	A3	TR	08:30-09:50	E305
Seminar:	AS1	F	10:00-10:50	J202

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: 15%
Midterms: 2 × 22.5% (Tentatively Thur Feb 13, Thur Mar 27)
Final: 40% (Cumulative, during exam period Mon Apr 14—Wed Apr 23)

It is the student's responsibility to be available to write the final exam at the scheduled time. Writing early is not permitted.

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 class
Week 2	Jan. 13-19	January 15—last day to add/drop
Week 3	Jan. 20-24	
Week 4	Jan. 27 -31	
Week 5	Feb 3-7	
Week 6	Feb. 10-14	Thursday February 13 Midterm Exam I (Tentative)
Week 7	Feb. 17-21	Family Day and Winter Break—No Classes
Week 8	Feb. 24 – 28	
Week 9	Mar. 3-7	
Week 10	Mar. 10—14	
Week 11	Mar. 17—21	
Week 12	Mar. 24-28	Thursday March 27 Midterm Exam II (Tentative)
Week 11	Mar. 31-Apr 4	Monday March 31—last day to withdraw
Week 12	Apr. 7-11	Friday April 11—last day of classes.

Final Exam Period Monday April 14—Wednesday April 23

STUDENT RESPONSIBILITIES: Students are responsible for all lecture material, labs and readings. Students are expected to practice the material by doing problems from the textbook. Assignments are not accepted if handed in late. If a midterm is missed due to illness the weight will be put on the next midterm or the final. If the final is missed due to illness it will be deferred (see calendar for information). A doctor's note and a phone message or email will be required in both cases.

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