

**GRANDE PRAIRIE REGIONAL COLLEGE
MATH 2250, LINEAR ALGEBRA II**

MA 2250 Linear Algebra II 3(3-1-0)

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.

Prerequisite: MA 1020 or MA 1200

Instructor:

Schedule: Lecture: Seminar:

Textbook: Linear Algebra and its Applications, 2nd Edition by David C. Lay.

Syllabus: Review of chapters 1-3, plus most of chapters 4 through 7.

Grading:	Quizzes	10%
	Assignments	10%
	Midterm Exam	10%
	Final Exam	10%

Problems: In addition to the formal assignment questions to be handed in for grading there will be problems given in each class from the textbook which you must do to successfully complete this course.

Seminars/

Assignments: During this hour, assistance in general textbook problems will be given. Also help on specific assignment questions is available during this period.

Quizzes: There will be weekly quizzes held during the class period. Quizzes, if missed, cannot be taken later.

Midterm: The Midterm Exam will be given during the mid-term week. If the midterm is missed for a valid reason, with accompanying letter, its value will be transferred to the final.

Final: The Final Exam time is set by the Registrar's Office.

Calculators: Calculators may be used in classes and seminars to check work. No calculators are permitted in the Midterm or Final Exam.

Detailed Course Contents

Date	Topics	References
Jan. 9	Review: <i>System of linear equations, matrices, row reduction, inverse matrices.</i>	Textbook: 1.1 – 1.8, 2.1-2.9
Jan. 11	Review: <i>Determinants and Cramer's Rule.</i>	Textbook: 3.1 – 3.2
Jan. 16	<i>Vector Spaces and Subspaces, Null Spaces, Column Spaces, and Linear Transformations.</i>	Textbook: 4.1, 4.2
Jan. 18	<i>Linearly Independent Sets; Bases. Coordinate Systems.</i>	Textbook: 4.3, 4.4
Jan. 23	<i>The Dimensions of a Vector Space, Rank</i>	Textbook: 4.5, 4.6
Jan. 25	<i>Change of Basis, Applications to Difference Equations</i>	Textbook: 4.7, 4.8
Jan. 30	<i>Eigenvectors and Eigenvalues, the Characteristic Equation</i>	Textbook: 5.1, 5.2
Feb. 1	<i>Diagonalization, Eigenvectors and Linear Transformations</i>	Textbook: 5.3, 5.4
Feb. 6	<i>Introduction to Complex Numbers, Examples</i>	Textbook: A3
Feb. 8	<i>Complex Eigenvalues, Discrete Dynamical Systems</i>	Textbook: 5.5, 5.6
Feb. 13	<i>Applications to Differential Equation, Iterative Estimates for Eigenvalues</i>	Textbook: 5.7, 5.8
Feb. 15	<i>Midterm Exam</i> (covers the material up to section 5.7)	Notes, formula sheets or calculators are not permitted
Feb. 21-25	Reading Week	
Feb. 27	Inner Product and Length	Textbook: 6.1
Mar. 1	Orthogonality	Textbook: 6.1
Mar. 6	Orthogonal Sets	Textbook: 6.2
Mar. 8	Orthogonal Projections	Textbook: 6.3
Mar. 13	The Gram-Schmidt Process	Textbook: 6.4
Mar. 15	Least-Square Problems	Textbook: 6.5
Mar. 20	Applications to Linear Models	Textbook: 6.6
Mar. 22	Inner Product Spaces	Textbook: 6.7
Mar. 27	Applications of Inner Product Spaces	Textbook: 6.8
Mar. 29	Diagonalization of Symmetric Matrices	Textbook: 7.1
Apr. 3	Quadratic Forms	Textbook: 7.2
Apr. 5	Constrained Optimization	Textbook: 7.3
Apr. 10	The Singular Value Decomposition	Textbook: 7.4 Exam on April 17 at 2 p.m.

Homework Assignments

	Selected Problems	Due Date
1.	<i>Textbook:</i> page 55: #2, page 65: #12, 22, 24, page 73: #4, page 84: #22, Page 107: #4, page 185: #6, page 193: #6	Jan. 12
2.	<i>Textbook:</i> page 217; #8, 12, page 218: #22, page 228: #6, page 229: #16, 26, 28, page 238, #14, 16, page 239: #26, page 248: #4, 10, page 249: #30	Jan. 24
3.	<i>Textbook:</i> page 255: #6, 14, 22, page 263: #4, page 264: #16, 20, page 270: #6, 8, 14, page 280: #6, 12, 16	Jan. 31
4.	<i>Textbook:</i> page 303: #8, 14, 19, page 304: #32, page 311: #12, page 312, #20, page 319: #6, page 320: #18, 24, page 327: #2, 6, 10, page 328: #20	Feb. 7

5.	<u>Textbook</u> : page 335: #4, 14, 22, page 346: #2, 4, 14	Feb. 14
6.	<u>Textbook</u> : page 355: #2, 10, page 363: #2, 14, 16	Feb. 26
7.	<u>Textbook</u> : page 376: #4, 10, page 377: #16, 20, 24, 26, 30	Mar. 7
8.	<u>Textbook</u> : page 386: #4, page 387: #12, 16, 22, 26, page 395: #2, 6, 8, 12, page 396: #20	Mar. 14
9.	<u>Textbook</u> : page 402: #2, 6, page 403: #12, 20, page 411: #2, 4, 6, 12, page 412: #18	Mar. 21
10.	<u>Textbook</u> : page 420: #6, 8, page 421: #14, page 430: #2, 4, 10, 20	Mar. 28
11.	<u>Textbook</u> : page 438: #6, 10, 14, page 448: #22, page 449: #24, 30	Apr. 4
12.	<u>Textbook</u> : page 457: #2, 6, 20, page 458: #24, page 465: #4, 10, page 475: #8, page 476: #16, 20	Apr. 11