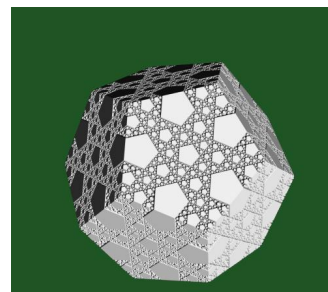


**MTH 244 Linear Algebra and Matrices
Semester 112 Course Syllabus**

Instructor: Karen E. Donnelly
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Monday 3:00 p.m. -- 4:00 p.m.
Tuesday 1:00 p.m. -- 3:00 p.m.
Wednesday 3:00 p.m. -- 4:00 p.m.

Thursday 1:00 p.m. -- 3:00 p.m.
Friday 10:00 a.m. -- 11:00 a.m.

Contact for appointment during other times

Home page: www.saintjoe.edu/~karend **Course Page:** www.saintjoe.edu/~karend/m244

Text: Williams, Gareth. *Linear Algebra with Applications, Alternate Edition*, 7th Ed. Jones and Bartlett Mathematics, 2010.

ISBN: 9780763782498

Course Objectives:

1. The investigation of fundamental concepts of linear algebra and matrices including:
 - a) Systems of linear equations, their matrix representation, their solutions,
 - b) Fundamentals of matrices and matrix operations,
 - c) Vector space theory,
 - d) Linear transformations,
 - e) Eigenvalues and eigenvectors, diagonalization
 - f) Numerical computation.
2. The application of linear algebra concepts to practical problems, using MATLAB software and calculators.

Course Outline:

1. Systems of Linear Equations (Chapter 1)
2. Matrices (Chapter 2)
3. Determinants (Chapter 3)
4. Vectors Spaces (Chapter 4)
5. Eigvalues and Eigenvectors (Chapter 5)
5. Numerical Methods (Chapter 8)

Test Schedule :

Test # 1 – Feb 1st Test # 2 – Feb 27th
Test # 3: -- March 28th Test #4 – April 23rd
Final Exam (comprehensive) – Monday April 30th 2:00 p.m.

Grade Distribution:

Assignments, Quizzes:	30%	Final Exam :	25%
Four Tests:	40%	Attendance and Participation:	05%

Grading Scale:

93%-100% A	90%-92% A-	
87%-89% B+	83%-86% B	80%-82% B-
77%-79% C+	73%-76% C	70%-72% C-
67%-69% D+	60%-66% D	
59% or lower F		

Expectations and Requirements:

Special Note: If you are a student with a disability, please meet with me immediately to discuss the accommodations you will need during class activity, examinations, and out of class assignments in order to participate fully and demonstrate your abilities.

1. Academic Honesty: Plagiarism or other forms of academic dishonesty on any assignments, tests, or quizzes will not be tolerated. If the instructor finds that a student has engaged in dishonesty, the student may be referred to the Dean of Academic Affairs for appropriate action.

2. Quizzes and Exams: Students are expected to be present for all exams. **No exams or quizzes may be made up** unless the student has contacted the instructor and received permission **prior** to the date of the original exam or quiz. This includes students participating in athletics who must arrange to take the quiz or exam **on or before the scheduled date**.

3. Assignments: Assignments, unless otherwise specified by the instructor, are to be **completed individually**. While students are encouraged to **consult** each other for ideas for assignments, the solutions should be completed individually. Any help one student gives another should be instructional help only. If the instructor feels that a student has not completed an assignment individually, the instructor may question the student on that assignment. The student should be able to explain how he/she worked the problem and should be able to work similar problems. **Late assignments will not be accepted without permission. If permission is given, the following penalties may be assigned:**

1 day late: 10% reduction

2 days late: 20% reduction

3 days late: 30% reduction

Not accepted after 3 days late.

Homework Guidelines:

- Write out complete answers NEATLY and CLEARLY.
- Number each exercise to the left.
- Problems should proceed in numerical order from top to bottom.
- You must show your work! Correct mathematical notation must be used. Partial credit is given when work is shown even if answer is incorrect. However, correct answers without any work shown will in general be given no credit.
- If the problem is a computation leading to a final answer, box the answer.
- **Use pencil and eraser** -- do not scratch out work.
- **Staple** your pages together before submitting.

Start homework early and see me for help with problems you don't know how to work! *It is inappropriate to ask how to do a problem in class the day it is due!!!!* My office is Core 257-- See my schedule for office hours or call or send email for an appointment. I am always delighted to help.

4. Class Preparation and Participation:

a) **Keep up with reading assignments.** To receive the maximum grade on attendance and participation the student must read assignments **prior** to class, be prepared to ask and respond to questions, and be an actively engaged participant in class.

b) Take good notes and **review notes** on a regular basis as well as promptly begin and continue work on assignments as they are assigned.

c) **Attendance is required.** If you must miss class due to illness or other valid excuse (e.g. athletic event) please send me email or telephone with an explanation prior to the class date.

d) **Electronic Equipment in class.** No devices with headphones may be used in class. All cell phones must be turned off during class. No laptops may be used in class unless permission is given by instructor.

5. Getting Help:

Students who do not understand a concept should do the following:

- a) Ask questions in class. (More than likely other students do not understand as well.)
- b) Seek individual help from the instructor. I am more than willing to give you the extra help you may need. Come in during office hours or make an appointment. Tutoring (free) can also be arranged either through me or through counseling services.
- c) Share with me any concerns you may have or any suggestions you have for the class structure that will help you learn more effectively.

The above content and requirements are tentative and subject to change according to time constraints and other factors as determined by the instructor.

MTH 244 Linear Algebra Semester 112 Calendar

Important Note: Dates and assignments updated as needed during the semester.

Date	Exams And Labs	Reading Assignment -- Complete by date given	Homework Due -- turn in at beginning of class on date given
Wed. 01/11	Gauss Jordan Tutor (Maple) Linear Algebra Toolkit Link	Sections 1.1, 1.2 Matrices, Gauss-Jordan Elimination	Ex. Set 1a: Section 1.1 (part 1)
Fri. 01/13		Section 1.2, con't	Ex. Set 1b: Section 1.1 (part 2)
Mon. 01/16		Section 2.1 Addition, Scalar Multiplication, Mult. of Matrices	Ex. Set 2: Section 1.2
Wed. 01/18	Lab : Fitting Polynomials	Curve Fitting (handout and section 1.3)	
Fri. 01/20		Section 2.2 Properties of Matrix Operations	Ex. Set 3: Section 2.1
Mon. 01/23		Section 2.3 Symmetric Matrices and Seriation in Archaeology	
Wed. 01/25		Section 2.4 Inverse of a Matrix and Cryptography	Ex. Set 4: Section 2.2
Fri. 01/27		Section 3.1 Determinants	Ex. Set 5: Section 2.3
Mon. 01/30			Ex. Set 6: Section 2.4
Wed. 02/01	Test 1		
Fri. 02/03		Section 3.2 Properties of Determinants	
Mon. 02/06		Section 3.3 Det., Matrix Inverses, and Systems of Eqns.	
Wed. 02/08	Markov Chain Lab	Background Lab Sheet Student Lab Projects	Ex. Set 7: Section 3.1
Fri. 02/10		Section 4.1 Vector Space \mathbb{R}^n	Ex. Set 8: Section 3.2
Mon. 02/13		Section 4.3: General Vector Spaces	Ex. Set 9: Section 3.3
Wed. 02/15			
Fri. 02/17		Section 4.4 Subspaces	
Mon. 02/20		Section 4.5 Linear Combinations	Ex. Set 10: Section 4.1
Wed. 02/22		Linear Combinations worksheet	Ex. Set 11: Section 4.2
Fri. 02/24			
Mon. 02/27	Test 2		Ex. Set 12: Section 4.3

Wed. 02/29		Section 4.6 Linear Dependence, Independence	Ex. Set 13: Section 4.4
Fri. 03/02			Ex. Set 14: Section 4.5
Mon 3/05 – Fri. 3/09		SPRING BREAK – NO CLASS	
Mon. 03/12		Section 4.7 Bases and Dimension	
Wed. 03/14	Student Lab:	Chemical Equations	
Fri. 03/16		Section 4.8 Rank	Ex. Set 15: Section 4.6
Mon. 03/19		Section 4.9 Orthonormal Vectors and Projections	
Wed. 03/21	Student Lab	Leontief Economic Model	Ex. Set 16: Section 4.7
Fri. 03/23		Section 5.1 Eigenvalues and eigenvectors	Ex. Set 17: Section 4.8
Mon. 03/26		Section 5.3 Diagonalization of Matrices	
Wed. 03/28	Test 3		Ex. Set 18: Section 4.9
Fri 03/30		Section 6.1 Matrix Transformations	
Mon 04/02		Section 6.2 Linear Transformations, Graphics	
Wed 04/04	Student Lab	Electrical Networks and Other Flow Networks	(Turn in this lab at by Monday 04/11 if not done in class)
Fri. 04/06		GOOD FRIDAY – NO CLASS	Ex. Set 19: Section 5.1
Mon. 04/09		EASTER MONDAY – NO CLASS	Ex. Set 20: Section 5.3
Wed. 04/11	Student Lab	Eigenvalues and Markov Chains	Ex. Set 21: Section 6.1
Fri. 04/13		Section 6.3 Kernel, Range, Rank-Nullity Theorem	Ex. Set 22: Section 6.2
Mon 04/16		Section 6.4 One-to-one and Inverse Transformations	Ex. Set 23: Section 6.3
Wed 04/18	Student Lab	Dominant Eigenvalues and Connectivity of Networks	Ex. Set 24: Section 6.4
Fri. 04/20		Section 8.1 Gaussian Elimination	
Mon 04/23	Test 4		
Wed. 04/25		Sections 8.2 LU Decomposition. M-file for lu factorization lufact.m	Set 26 and Set 27 Completed in class (8.1 and 8.2)
Fri. 04/27		Review	
Mon. 04/30	FINAL EXAM	2:00 p.m. Comprehensive	

MTH244 Linear Algebra Semester 112 Exercise List

Ex. Set 1a	Section 1.1: 1 all; 3; 4; 5 b, f, h; 6 f g;
Ex. Set 1b	Section 1.1, con't: 7 b, d, f; 8 all, 10 a,c,e (For 10 show work step by step as in example 2 ; 13c (See Example 4 – show work)
Ex. Set 2	Section 1.2 1 all; 4 all; 6 a, d; 8 e, g
Ex. Set 3	Section 2.1 1 all; 4 all; 8 a,b,c,l 10b; 15 a,b
Ex. Set 4	Section 2.2: 1 a,b; 3; 4b; 6 a, b, e; 9 a; 14 c; 32 a,c;
Ex. Set 5	Section 2.3: 1 a, d, f; 2b; 4b; 15 c; 27 c,d
Ex. Set 6	Section 2.4: 2a,c; 3 b,e; 4 c, d (use calculator or MATLAB rref on augmented matrix for 4); 8c; 9b (use calc or MATLAB for inverse for 9b); 15 all; 27; 37
Ex. Set 7	Section 3.1: 2 b, c; 4 all; 5 d; 7b; 9c; 10b; 11a, b; 13
Ex. Set 8	Section 3.2: 2 b; 3 all; 4 all; 7 all, 9 all; 13c; 14a
Ex. Set 9	Section 3.3: 2 all; 4 all; 5b, 6b; 8 a, b; 10 c; 14 a, b
Ex. Set 10	Section 4.1 1; 2; 3b, 7a, c, e; 9b, 10b
Ex. Set 11	Section 4.2 3a,b,d; 4c; 7a,b,d; 8d; 10 a,b,c; 13 c,d; 16 a,b; 19 a,b; 22 a,c
Ex. Set 12	Section 4.3 2a; 5, 7, 8, 13 (Be sure to justify your answers clearly).
Ex. Set 13	Section 4.4 1a, d; 2 b, d, e, f; 5 all; 7 b,d; 8a, b; 11 all (justify your answers)
Ex. Set 14	Section 4.5 1a, c; 2 a, f; 3a; 5; 11; 12 a,b; 13c
Ex. Set 15	Section 4.6: 1 a, c, f; 2 a, d; 6 a,b,c,d; 16, 17
Ex. Set 16	Section 4.7: 1a; 2b,c; 4a,b; 5b,c; 6 all; 9, 13, 15a,d; 16a,b; 17a,d
Ex. Set 17	Section 4.8: 1a,d; 2b,c,3; 4 all; 5a,c; 6 b,c; 7 c, d; 8, 9 (For 4,5,6,7,8,9 use rref); 11 d,e,f; 12 a,b
Ex. Set 18	Section 4.9: 1c,d; 2a,c; 3b,c; 4; 5; 6c; 13 c,d; 15b; 16a; 17a; 18a; 22a
Ex. Set 19	Section 5.1: 2, 5, 10, 11,14
Ex. Set 20	Section 5.3 4b,c; 5b (For 5b use answers to 14 from 5.1)
Ex. Set 21	Section 6.1 2; 5a,e; 6; 8b, c; 11a; 12 a,b
Ex. Set 22	Section 6.2 1, 4b; 7, 8a,b; 13 a,b; 19; 20; 21
Ex. Set 23	Section 6.3 1a,f,h; 2 b,d;
Ex. Set 24	Section 6.4: 1a,b,d,f (use rref); 2a, b, c, d; 4a,b; 5a
Ex. Set 25	Section 8.1: 2 all; 4 using matrices
Ex. Set 26	Section 8.2: 1, 5, 9, 10, 13 (Use Calculator or MATLAB LU command for 9, 10, 13)