Framingham State University

Syllabus

MATH 226 - Linear Algebra and Applications

Summer 2019

Disclaimer: This syllabus is intended to give the student guidance in what may be covered in the course and will be followed as closely as possible. However, the professor reserves the right to modify, supplement and make changes as needs arise.

Instructor: Professor Sandberg
Email: ssandberg@framingham.edu
Office Hours: By appointment
Credit: 4
Time: 2 hours/day Mon – Fri
Classroom: TBD

Required Text: Howard Anton, *Elementary Linear Algebra* (11th ed), John Wiley & Sons, Inc.

Description Catalog

A study of vector spaces, subspaces, linear dependence, bases, dimension, linear mappings, linear equations, matrices, inner products and norms, determinants, quadratic forms, and the spectral theorem. Applications to various fields outside of mathematics are examined. Prerequisites: MATH 206 Discrete Mathematics I and MATH 219 Calculus I.

Topics to be covered include: systems of linear equations, matrices, determinants, vectors and vector spaces, inner product spaces, linear transformations, eigenvalues and eigenvectors. Applications and the history of linear algebra will also be discussed.

Course Hours

The course has 25 sessions in total. Each class session is 120 minutes in length. The course meets from Monday to Friday. Federal regulations dictate that students be required to engage in two hours of work outside of class for each credit hour. So, a summer school student is expected to spend 4 hours per day outside the regular classroom reviewing notes, working homework problems and preparing for exams.

Calculators and Cell phones: No calculators may be used on tests. Cell phones must be turned off and put away during tests.

Homework: There will be regular homework assignments. Students are encouraged to work together on the homework problems, but the homework will not be graded. However, it is very important to do all the homework

Attendance and in-class work: Students are expected to be in class every day for the full class period. Material will be covered very quickly; it will be difficult to catch up, should one fall behind. We will spend some time in class working on problems. Some of this work may be presented or turned in.

Approximate Day-to-Day Schedule: This schedule is subject to change.

	Topics	**Textbook Sections**
Week 1		
(8th July-	Systems of linear Equations	section 1.1
12th July)	Gaussian Elimination	section 1.2
	Matrix Operations	section 1.3
	Matrix Inverses	section 1.4-1.6
	Exam 1	
Week 2		
(15th July	Special Matrices	section 1.7
-19th July)	Matrix Transformations	section 1.8
	Cofactor Expansion	section 2.1
	Determinants	section 2.2
	Cramer's Rule	section 2.3
	Vectors	section 3.1
	Exam 2	
Week 3		
(22nd July	Norm and Dot Product	section 3.2
-26th July)	Orthogonality	section 3.3
	Geometry of Linear Systems	section 3.4
	Cross Product	section 3.5
	Real Vector Spaces	section 4.1
	Subspaces	section 4.2
	Exam 3	
Week 4	Linear Independence	section 4.3
	Bases	section 4.4
(29th July	Dimension	section 4.5
-2nd August)	Change of Basis	section 4.6
	Spaces – Row, Column, Null	section 4.7
	Rank and Nullity	section 4.8
	Exam 4	

Week 5	Eigernvalues Eigenvectors	section 5.1
(5th August	Diagonalization	section 5.2
-9th August)	Complex Vector Spaces	section 5.3
	Inner Products	section 6.1
	Angle and Orthogonality	section 6.2
	Gram-Schmidt Process	section 6.3

Final Exam

Exams: There will be an hour-long, closed-book exam each week. THERE WILL BE NO MAKE-UP EXAMS. In the event that a student misses an exam and presents an acceptable reason to the instructor, the final exam grade will be counted for the missed exam. If you are able to do the homework problems, then you should do well on the exams because the questions on the exams will look very similar to the homework. If they don't, please come and see me right away.

I have frequent exams so that you and I both know how you are doing throughout the semester. If you start doing poorly on the exams, please come and see me so that we can together figure out how you can improve. Don't get behind in this class because it is very difficult to catch up when you do.

Final Exam: A comprehensive final exam will be given during the last week.

Grading: The exam average will count 70% of the final grade and the final exam will count 30%. The letter grade will be calculated as follows:

Overall Average Grade	Letter Grade
95 – 100	A
90 - 94	A-
87 - 89	B+
83 - 86	B
80 - 82	B-
77 - 79	C+
74 - 76	C
70 - 72	C-
67 - 69	D+
63 - 66	D
60 - 62	D-
00 - 59	F

Academic Honesty: I expect that all of your work will be your own. Please review the Academic Honesty Policy of Framingham State University, the Academic Regulations on pages 28-46 of the Framingham State University Undergraduate Catalog 2018-2019, and the information below. Integrity is essential to academic life. Consequently, students who enroll at Framingham State University agree to maintain high standards of academic honesty and scholarly practice. They shall be responsible for familiarizing themselves with the published policies and procedures regarding academic honesty.

Academic honesty requires but is not limited to the following practices: appropriately citing all published and unpublished sources, whether quoted, paraphrased, or otherwise expressed, in all of the student's oral and written, technical, and artistic work; observing the policies regarding the use of technical facilities.

Infractions of the Policy on Academic Honesty include, but are not limited to:

1. Plagiarism: claiming as one's own work the published or unpublished literal or paraphrased work of another. It should be recognized that plagiarism is not only academically dishonest but also illegal.
2. Cheating on exams, tests, quizzes, assignments, and papers, including the giving or acceptance of these materials and other sources of information without the permission of the instructor(s).
3. Unauthorized collaboration with other individuals in the preparation of course assignments.
4. Submitting without authorization the same assignment for credit in more than one course.
5. Use of dishonest procedures in computer, laboratory, studio, or field work.
   Further clarification on academic honesty will be provided, when appropriate, in individual courses.
6. Misuse of the University's technical facilities (computer machinery, laboratories, media equipment, etc.), either maliciously or for personal gain. Examples include but are not necessarily limited to:
   a) Accessing the private files of another person or agency without express permission.
   b) The unauthorized use of technical facilities for purposes not connected with academic pursuits. When evidence indicates that a student has improperly used a technical facility, an appropriate supervisor (faculty or staff member) may take appropriate action reflecting the seriousness of the infraction, ranging from a verbal warning to, but not beyond, denial of use of the facility. If coursework may have been plagiarized, the supervisor will also inform all concerned faculty members, who may take action as described in the procedures for handling cases of alleged infractions of academic honesty.
7. Falsification of forms used to document the academic record and to conduct the academic business of the University

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Framingham State University is committed to a policy of non-discrimination, equal opportunity, diversity, and affirmative action. The University is dedicated to providing educational, working, and living environments that value the diverse backgrounds of all people. Furthermore, the Massachusetts Civil Rights Act ("MCRA," M.G.L. c. 12, §§ 11H, 11I, 11J) protects the rights of all residents of and visitors to Massachusetts to be free from bias-motivated threats, intimidation, and coercion that interfere with their civil rights. The MCRA protects the right to attend school, live peacefully, and enjoy other basic rights.

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