

SCMA 259 Linear Algebra

First Semester Academic Year 2022-2023

Faculty of Science, Mahidol University

Student Groups Materials Science and Nano Engineering, Bioresources and Environmental Biology, and Industrial Mathematics

Class Schedule Thursday at 9:00-12:00

Instructors Dr. Piyanan Pasom
Department of Mathematics, Faculty of Science, Mahidol University

E-mail: piyanan.pas@mahidol.ac.th Tel. 02-201-5340

Course Description

Vector spaces, Linear transformations, Inner product spaces, projections on to subspaces, Least squares, Eigenvalues and eigenvectors, Diagonalization and Jordan forms, Complex vector spaces, Singular value decomposition and the pseudoinverse, Systems of linear differential equations.

Grading Policy

Student evaluation is in accordance with the rules and regulations of the Faculty of Science, Mahidol University. Letter grades of A, B+, B, C+, C, D+, D, and F will be evaluated according to the student's score.

Score consists of:	Class Attendance	5%	Midterm Exam	35%	Quiz	10%
	Assignments	15%	Final Exam	35%		

All students are required

- To come to class on-time and have an attendance record of 80% for the whole course. Otherwise students will not be allowed to take the examination.
- To dress properly. Otherwise students will not be allowed to sit in the class.

Course Timetable

Week	Topic/Details	Number of hours		Teaching activities/ media	Instructors
		Classroom sessions	Practice sessions		
1	System of linear equations, Gauss-Jordan elimination	3	0	Teaching method: Interactive lecture, effective questioning, formative assessment, problem solving, problem based activities Media: lecture notes, individual assignments	Dr. Piyanan Pasom
2	Vector spaces and Subspaces, Linear Independence,	3	0		
3	Span, Basis and Dimension	3	0		
4	Fundamental subspaces of matrices Linear Transformations -Basic Definition and examples	3	0		
5	Linear Transformations (continued) - Kernel and Range of a Linear Transformations	3	0		
6	Linear Transformations (continued) - Matrices Representation for Linear Transformations	3	0		
7	-Scalar Product and orthogonality in the Euclidean space \mathbb{R}^n - Orthogonal subspaces	3	0		
8	- Projections onto subspaces, Least Squares Problems	3	0		
9	Midterm examination				

Week	Topic/Details	Number of hours		Teaching activities/ media	Instructors
		Classroom sessions	Practice sessions		
10	Inner product spaces - Basic definitions and its properties- Orthogonal and orthonormal bases	3	0		
11-12	Eigenvalues and eigenvectors Diagonalization Jordan forms	6	0	Teaching method: Interactive lecture, effective questioning, formative assessment, problem solving, problem based activities Media: lecture notes, individual assignments	Dr. Piyanan Pasom
13	Complex vector spaces, Complex eigenvalues and eigenvectors	3	0		
14	Hermitian matrices, Unitary matrices and unitarily diagonalization	3	0		
15	The Singular value decomposition and pseudoinverse of matrices	3	0		
16	Systems of linear differential equations	3	0		
17	Final examination				
	Total	45	0		

Textbooks

- Howard Anton and Chris Rorres. **Elementary Linear Algebra with Applications**. 10th Ed. New York: Wiley. 2010.
- Steve Leon, **Linear Algebra with Applications**, 8th Ed., Pearson, 2009