



SYLLABUS

Course Code	Course Num.	Course Name	Credit Hours	Lec.	Lab.	Tut.	Private study	Pre-requisites	Course Level	Teaching Language
MAT	221	Introduction to Linear Algebra	3	2	0	2	6	MAT 101	2 ¹	English

A. Course Description

This course describes the most important ideas, theoretical results, and examples of systems of linear equations, matrices, determinants, linear transformations, eigenvalues and eigenvectors. The course includes the essential fundamentals of these topics. The emphasis is on calculations.

B. Course Outcomes

At the end of this course the student will be able to:

- Use matrices concept and methods of linear algebra.
- Be familiar with basics of vector spaces and linear transformations.
- To connect linear algebra to other fields.

C. References:

Required Textbook

Linear Algebra, Gareth Williams, Jones and 6th Edition, Bartlett, 2008.

Other references

- *Linear Algebra, Schaum's Outline*, S. Lipschutz, M. Lipson, 3rd Edition, McGraw-Hill, 2000.
- *Linear Algebra with Application*, W. K. Nicholson, 5th Edition, McGraw-Hill, 2006.
- *Linear Algebra with Application*, O. Bretscher; 4th Edition, Pearson Ed. Int., 2009.

¹ B.Sc. in Physics.



D. Topics Outline

1. **Systems of Linear Equations:** Solving Linear Systems, Matrix Notation, Augmented Matrix of a Linear System, Gauss Jordan Elimination, Row Reduced Echelon Form of a Matrix.
2. **Matrices:** Algebra Of Matrices, Transpose of a Matrix, Inverse of a Square Matrix, Gauss Jordan Elimination for Finding the Inverse of a Matrix.
3. **Determinants:** Determinants and their Properties, Determinant by Row Reduction and Cofactor Expansions, The Adjoint Matrix, Cramer's Rule.
4. **Vector Spaces:** General Definitions, Subspaces, Linear Combinations, Spanning Sets, Linear Dependence and Independence, Basis and Dimension, Rank of a Matrix, Inner Product, Orthonormal Basis, Orthogonal Matrices, Gram-Schmidt Orthogonalization Process.
5. **Eigenvalues and Eigenvectors:** Eigenvalues and Eigenvectors, Characteristic Polynomial, Computation of Eigenvalues and Eigenvectors, Diagonalization of a Matrix.

E. Office Hours

Office hours give students the opportunity to ask in-depth questions and to explore points of confusion or interest that cannot be fully addressed in class.

F. Exams & Grading System

The semi-official dates of the exams for this course are:

- **Midterm 1:** 6th or 7th week.
- **Midterm 2:** 11th or 12th week.
- **Quizzes & Homework:** During the semester.
- **Final Exam:** 16th week.

Your course grade will be based on your semester work as follows:

Midterm 1: 20 %	Midterm 2: 20 %	Final Exam: 40 %
Quizzes, Homework, Attendance & Participation: 20 %		

The grading distribution:

A⁺	A	B⁺	B	C⁺	C	D⁺	D	F
[95, 100]	[90, 95)	[85, 90)	[80, 85)	[75, 80)	[70, 75)	[65, 70)	[60, 65)	[0, 60)



G. Student Attendance/Absence

Only three situations will be considered as possible excused absences:

- Occurrence of a birth or death in the immediate family will be excused. (“Immediate family” is defined by the University as spouse, grandparents, parents, brother, or sister).
- Severe illness in which a student is under the care of a doctor and physically unable to attend class will be excused. Students are not excused for a doctor's appointment. Do not make appointments that conflict with rehearsals. Notes from the University Health Center will be accepted.

[Executive Rules for Study Regulations and Exams](http://goo.gl/ykm7t3)
goo.gl/ykm7t3

