Linear Algebra

Course # DMNS 2012

Credits 3

Course Description

Linear Algebra is a foundational course at UCA. It can be applied in business, economics, sociology, ecology, demography, engineering and other areas.

In this course, students will study mathematics that deals with the system of linear equations and their applications, operations with matrices, applications of Markov chains, applications of determinants, eigenvalues and eigenvectors and their applications.

Course Learning Outcomes

Upon completion of this course, students should be able to:

- Set up and solve a system of equations to fit a polynomial function to a set of data points.
- Use matrices and Gaussian and Gauss – Jordan eliminations to solve a system of linear equations.
- Do operations with matrices.
- Find the inverse of a matrix.
- Use a stochastic matrix to find the n^{th} state matrix of a Markov chain.
- Find steady state matrices of absorbing Markov chain.
- Use matrix algebra to analyze an economic system (Leontief input- output model).
- Find the least square regressions line for a set of data.
- Use Cramer's rules to solve a system of n linear equations in n variables.
- Model population growth using an age transition matrix and an age distribution vector.
- Solve Linear Algebra problems wit the application of R studio.

Course Assessments and Grading

Item	**Weight**
Test 1 a) paper based test; b) computer (R studio) based test.	 15 % 10 %
Attendance	5 %
Test 2	

Item	**Weight**
a) paper based test; b) computer (R studio) based test.	15 % 10 %
Test on independent work	15 %
Final exam	30 %