

MME 526 Linear Models I

Fall 2016

instructor: John Goulet, PhD goulet@wpi.edu

course objectives:

- a) review basic linear algebra: solutions of systems, matrix algebra, vectors and vector spaces, eigenvalues and diagonalization
- b) work with modern models that may be analyzed with that linear algebra: market share, regression, populations, quadratic forms, graphs

note: the course continues on with *Linear Models II* with additional applications including binomial graphs, Google searches, linear programming, and project management.

materials needed:

Linear Algebra and It's Applications David Lay 4th edition Addison Wesley

Maple (or similar software)

grade based upon:

weekly homework 70%

exam 30%

Topics to be addressed:

Linear systems of equations - vector form of solutions, nature of solutions, algorithms

Matrix arithmetic and algebra

inverses, powers, notation

stochastic matrices

Regression Analysis

Markov Chains and Market Share

Population Models

development

asymptotic behavior of solutions

intro to dominant eigenvalue concept

software considerations

Diagonalization

eigenvalues, eigenvectors

Principal Axis Theorem

Perron-Frobenius

Dynamical Systems $x(k+1) = A x(k)$