Thursday and Thursday
Office Hours: Any time by appointment and 12:00 - 2:00

- Mathematics course.

be at the level of an introductory undergraduate
introductory matrix theory. The last two are assumed to
Calculus, introductory differential equations, and
Pre-requisites: Programming ability, three semesters of
Library, Gallivan\textcopyright{\textregistered} (\texttextdegree{}n)
Instructor: K. A. Gallivan (5-0306, 476 Dirac Science
Thursday
Science
Library, 499 Dirac Science Library 2:00 - 3:15 Thursday and

CIS 5930 Foundations of Computational
Grades: Homework 40%, midterm 30% and final 30%.


2. C. W. Stewart, Introduction to Matrix Computations

3. C. Golub and C. Van Loan, Matrix Computations

(possibly the best introductory book on numerical linear algebra)


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Follow the teaching link from available to the class via the web.

PDF and Postscript versions of the class notes will be appropriate.

Homework will include programming assignments where
the Hermitian eigenvalue problem

the effects of finite precision

the solution of linear systems of equations

vector space basics

Topics include:

- Problems.
- Methods to solve finite dimensional numerical linear algebra
- Matrix transformations to develop factorization-based

The first half of the course covers the use of elementary

introducing linear operators.

PCS 1 considers algorithms associated with problems

Topics
the singular value decomposition and its applications.

- and Riccati equations.
- the simplex method,
- methods for linear least squares,
- matrix methods associated with optimization problems.
the semester.

Caltech methods to solved differential equations concludes.

if time permits, a brief introduction to the use of Monte Carlo methods. Linear algebra problems.

the resulting linear algebra problems.

computational techniques that exploit the structure of partial differential equations.

the use of finite differences.

Topics include:

the second half of the semester discusses the solution of continuous problems via discretization.
algorithms and their implementation for selected topics.

We will introduce the analysis and design of parallel

consultation with the registered students.

separate recitation sessions that will be scheduled in

Discussions of implementation issues are contained in

methods and investigate their performance.

Throughout the semester students implement selected