Course Info:
MATH 547 - Linear Algebra and Applications
Spring 2013 - Sections 001 & 003

Time/Place:
Tu, Th: 2:00 PM - 3:15 PM, Phillips Hall 385 - Section 001,
Tu, Th: 9:30 AM - 10:45 AM, Kenan Labs B121 - Section 003.

Instructor:
Jeremy Louis Marzuola

Contact Info:
E-mail: marzuola@math.unc.edu
Office: Room 324-D Phillips Hall
Office Hours: Tu, Th: 3:30 PM - 4:30 PM, W: 9:30 AM - 10:30 AM
Note: Some weeks Thursday office hours will be cancelled due to the Departmental Colloquium Series. Those Thursdays are currently scheduled as February 14th, February 28th, March 7th, March 21st and April 11th.

Teaching Assistants:
Section 001 - Michael Schuster
E-mail: mjschust@live.unc.edu
Office: Phillips 30
Office Hours: Thursday 9:50-10:50 AM

Section 003 - Cass Sherman
E-mail: cas1987@live.unc.edu
Office: Phillips 365 - Math Help Center
Office Hours: Monday 3-4 PM

Graduate Research Consultant - Chung-Nan Tzou
E-mail: pgtz31@live.unc.edu
Office Hours: By Appointment to Start. More Regular Meetings to be Held Later in the Semester.
Topics:
I. Matrix Algebra and Linear Systems
II. Linear Transformations, Bases and Dimension
III. Orthogonal Projections and Matrix Factorization
IV. Determinants, Eigenvalues and Eigenvectors
V. Symmetric Matrices, Quadratic Forms and SVD (Time Permitting)

Scheduling:
As there are 27 total class periods and roughly 30 Sections in the book, we will attempt to march forward at roughly one section per day. This will be greatly assisted if some time is put in PRIOR to coming to class reading the section and developing questions. The better prepared everyone is for class, the more time we can spend working on examples and solving problems.

Prerequisites:
The course requires Math 233 or the equivalent.

Required Course Texts:

Grading:
The course will be graded on weekly homework assignments (20%), two midterm exams (20% each), an individual project (15%) and a comprehensive final exam (25%).

Homework Assignments:
The homework assignments will be due to the TA’s mailbox each Friday by 9 AM, beginning January 18th, 2013. The goal will be to have all homework turned back to the students by the following Tuesday for studying purposes. Each course period, I will assign a handful of problems related to that day’s course material, which will become part of that week’s homework. A full homework assignment will cover the problems from consecutive Thursday, Tuesday class periods. No homework will be collected the week of exams, but will be due the following week.

No late homework assignments will be accepted but the two lowest homework scores from the semester will be dropped. Each homework assignment is a total of 15 points, 5 for completion and 10 from 4 randomly assigned problems the TA will grade in full detail.

Though I encourage communication on the homework assignments, each student should write up the assignment on their own. Also, while I encourage interested students to learn *Matlab* or *Mathematica* to check their work as we progress through the material, the
exercises should be worked out by hand so your understanding of the underlying mechanics of Linear Algebra can be ascertained.

**Exams:**
The midterm exams will be in class on Thursday, February 21st, 2013 and Thursday, April 4th, 2013 and will cover material discussed up to the previous Tuesday. The final exam will occur at the standard schedule time according to the University Registrar Schedule, which is Tuesday, May 7th, 2013 at 8:00 AM for Section 003 and Tuesday, May 7th, 2013 at 12:00 PM for Section 001.

**Projects:**
In this research-exposure course, you will be working with a Graduate Research Consultant, Chung-Nan Tzou, who will assist you in the research project. The GRC Program is sponsored by the Office for Undergraduate Research ([www.unc.edu/depts/our](http://www.unc.edu/depts/our)), and you may be able to use this research-exposure course to meet a requirement of the Carolina Research Scholars Program ([http://www.unc.edu/depts/our/students/students_crsp.html](http://www.unc.edu/depts/our/students/students_crsp.html)). I encourage you to visit the OUR website to learn about how you might engage in research, scholarship and creative performance while you are at Carolina.

Linear Algebra arises ubiquitously in both complex mathematical subjects like geometry and differential equations, but throughout applications including computational science, data assimilation, physics, chemistry, climate models, economic forecasting, etc. The goal of the project is for you to explore one of these applications in the area of your particular interest by producing a 7 – 10 page (not including references) report introducing the application, discussing the relevant ideas from linear algebra and doing a model computation to illustrate the idea. The project will be approached in stages with a paragraph suggesting a project idea due by February 21st, 2013, at which time the class will be split into project groups of 3-4 students with similar interests. These students will meet together a few times throughout the semester in class and can meet as often as they like (with the GRC as well) to discuss their projects, read each other’s drafts and give feedback on ideas, writing, computations, etc. Throughout the semester, there will be further due dates to make sure students are talking to the GRC, progressing and working on the research project: a list of references used due by March 8th, 2013; a rough draft due by April 9th, 2013; the final project due via e-mail by 5 PM on April 23rd, 2013; and final discussion will be done in project groups with the last 45 minutes of class on April 25th. In addition, on April 27th, all projects will be made available on the web-site for all students to read and peruse at their leisure to learn from their classmates.

**Honor Code Statement and Course Policies:**
It is expected that each student will conduct themselves within the guidelines of the UNC
Honor System. Upon entering class, all cell phones and laptops should be turned off and put away. Exams will be closed book and without calculators. Please put all cell phones, laptops and calculators away before coming to class for any exam.

**Make-up and Absentee Policy:**
Attendance at every class is strongly encouraged. No make-ups will be given for homework assignments. Missed in-class exams can be made up only if a written medical/coach excuse is provided showing you were unable to attend. No changes are permitted for the final exam without appeal to the Dean.