Fall 2009

MATH 3500(H)–3510(H)
SYLLABUS

T. Shifrin

Text: Theodore Shifrin, *Multivariable Mathematics: Linear Algebra, Vector Calculus, and Manifolds*, John Wiley & Sons, 2005.

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Web page for the class at

`http://www.math.uga.edu/~shifrin/MATH3500/MATH3500.html`

Office Hours: to be decided in class and posted on the web page.

This two-semester class is a theoretical and more challenging amalgamation of MATH 2500 and MATH 3000. Proofs of theorems and additional physical applications will be stressed. You are expected to attend class **every day**, participate in class, and read the text and do homework **every night**. Homework will be collected once a week and **selected exercises** will be graded carefully. Some portion of the homework may be WebWork problems that you do on-line. "Challenge problems" will count as extra credit (up to 10% of your grade). Your grade will be calculated as follows:

hour exams (3)	30%
final exam	30%
homework and class participation	30%
your best component	10%

Hour exams are tentatively scheduled for September 18, October 21, and November 20, 2009. The last day to withdraw with the possibility of a WP is October 22.

N.B.: No late homework or makeup exams. Although I encourage you to work on homework with **a few** other students, you **must** write up your assignments **by yourself**. You must comply with UGA's Academic Honesty Policy; see particularly Sections 5, 7, and 8 at the website

`http://www.uga.edu/honesty/ahpd/culture_honesty.htm`

All students are responsible for maintaining the highest standards of honesty and integrity in every phase of their academic careers. The penalties for academic dishonesty are severe and ignorance is not an acceptable defense.

Course Outline for MATH 3500(H)–3510(H)

1. Vector algebra and geometry, matrices, linear maps, determinants.
2. Functions, limits, continuity; the derivative.
3. Solving linear systems: Gaussian elimination, linear independence, basis and dimension.
4. Maximum/minimum problems, projections. What is a manifold?

Final exam for MATH 3500(H): Thursday, December 10, 2009, 12:00–3:00 p.m.

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5. Integration, applications to physics, determinants and the change of variables theorem.
6. Nonlinear problems and manifolds.
7. Differential forms and integration on manifolds. Stokes's Theorem. Applications to physics (div, curl, and all that) and topology.
8. Eigenvalues and eigenvectors, difference and differential equations, spectral theorem and applications to quadratic forms.