# DIFFERENTIAL EQUATIONS II

COURSE: MATH 445

BRONSON HALL 440                                         11:15-12:30 TTh

TEXT: <u>Elementary Differential Equations and Boundary Value Problems</u>, 5th edition by W. Boyce and R. DiPrima.

INSTRUCTOR: Dr. Robert Gardner

OFFICE: Bronson Hall 422

OFFICE HOURS: 1:00-3:00 Monday thru Friday.

PHONE: 797-5131 (Math Office 797-5377)

We will emphasize applications whenever possible. The most common application will be to physical problems such as spring-mass systems and electrical circuits. We will also deal with the predator-prey model from ecology (when we address nonlinear problems). We will see several applications to the area of Special Functions.

There has been a recent surge of interest in "chaos," "strange attractors," and "dynamical systems." We will discuss these topics and their connection to non-linear diferential equations.

TENTATIVE OUTLINE (CHAPTER.SECTION):

Test 1: 7.1-7.9 = Systems of linear differential equations, review of linear algebra.

Test 2: 9.1-9.8 = Nonlinear differential equations, stability, qualitative behavior, Liapunov functions, chaos.

Test 3: 6.1 - 6.6, 11.1-11.4 = Laplace transforms, integral transforms, Convolution Theorem, Sturm-Louiville boundary value problems.

Additional topics of a more theoretical nature will be covered if time permits.

Homework (H) will be collected every other Friday (late homework will not be accepted). Other homework will be assigned, but not collected. Tests will be spaced at roughly 4 week intervals. The final (F) will be comprehensive. Your grade will be calculated as:

$$AVERAGE = \frac{T_1 + T_2 + T_3 + H + F}{5}.$$

Grades will be assigned as follows:

A = 90-100, B = 80-89, C = 70-79, D = 60-69, F = 0-59

All students are expected to attend class and make-up tests will be given only under the most EXTREME conditions.

Important dates:

Friday, August 28 = Last day to add courses for credit or to change from audit to credit.

Monday, September 7 = Labor Day Holiday.

Tuesday, September 15 = Last day to drop courses or resign without receiving grades of W.

Monday, October 5 = Last day to change from credit to audit.

Friday, October 9 = Fall Break.

Tuesday, November 3 = **LAST DAY TO DROP** or to resign.

Thursday and Friday, November 26 and 27 = Thanksgiving Holidays.

Friday, December 4 = Classes end.

Tuesday, December 8 = The final exam is on this date, 10:30 a.m. to 12:30 p.m.