

Math 352 – Fall 2009
DIFFERENTIAL EQUATIONS FOR TECHNOLOGISTS
§41622 MTH 352 TR 3:30-4:45 D 315
Preliminary Syllabus

Professor: Dr. Lee Townsend
Office Hours: W 1:30-2:30, TR 2:05-3:05, TR 6:15-7:15 in UT 236
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Texts: *REQUIRED*
Schaum's Outline of Differential Equations, 3rd edition
By Bronson and Costa

RECOMMENDED
Basic Technical Mathematics with Calculus, 9th ed. or Technical Calculus with
Analytic Geometry, 4th ed.
by Allyn J. Washington, Addison-Wesley
Mathematical Handbook of Formulas and Tables (Schaum's Outline Series)
by Murray R. Spiegel, John M. Liu, McGraw-Hill
Elementary Differential Equations, 4th ed.
by Derrick and Grossman, Addison-Wesley
Fundamentals of Differential Equations
by Nagle, Saff, and Snider, Addison-Wesley
TI-89 handout from my web site <http://uhaweb.hartford.edu/ltownsend/>

Calculator: TI-89 (preferred as it solves differential equations with initial conditions symbolically)

Prerequisite: C- or better in MTH 241 or passing of MTH 241 placement exam

Course Objectives

1. The students will become familiar with using mathematics to model physical and technological systems. The students will learn how to solve the following problems:
RL, RC, RLC circuits both series and parallel
Undamped, damped and forced vibrations
Newton's law of cooling
Population growth leading to logistic growth
2. The students will develop an appreciation for the meaning of time constants and how they help design and understand systems.
3. The students will develop a basic understanding of how to use Laplace transforms to solve differential equations.
4. The students will develop a basic understanding of computer solutions to differential equations. Euler's method will be used.

Important concepts from Math I → IV

1. Algebra, especially symbol manipulation
2. Use of integral tables – pattern recognition
3. Partial fraction expansion – used in Laplace Transforms (TI-89 Expand())
4. Solving n equations in n unknowns - used in Laplace Transforms
5. Manipulation of exponents, hence logs.
6. Completing the square - used in Laplace Transforms. A TI-89 function is available:
<http://uhaweb.hartford.edu/ltownsend/comsqr.zip>

Grade Calculation

There will be two hour exams, one covering first order differential equations and the other, second order differential equations. A third hour exam will be given during the final exam period covering the material in exams one and two. I will drop the lowest grade of the three hour exams. The final covers Laplace transforms.

Grade scaling, if any, will occur on the final course. Your grade is based on exam performance (90%) as well as homework (10%). Good attendance, attitude and exceptional class participation will raise your grade in borderline cases. Historically, poor attendance as well as not doing the optional homework both lower your grade. Should you miss a class please get the class notes and any handouts from a classmate.

Homework

Homework will be assigned in which you will solve application problems. You may work in groups of up to three. Turn in one homework set with the names of all members of your group on the first page. In-class problem sets will be assigned. If you do not finish them in class, then you need to finish them at home. This homework is necessary but will not be graded.

Missed exam policy

Since I am dropping the lowest hour exam grade, there will be no make-up exams unless you are suffering from an extended illness, such as the flu or mono or your job interferes with your attendance. Permission must be obtained *before* the original exam date or deadline in order to take any delayed exams. You may notify me by email or text message. Please identify yourself and course number in either case.

Missed class policy

You are responsible for obtaining all class notes and handouts from fellow students. DO NOT SHOW UP IF YOU ARE ILL.

Relevant web sites:

- I recommend you download the review sheets from <http://tutorial.math.lamar.edu/>
- There is a TI-89 tutorial on my web site : <http://uhaweb.hartford.edu/ltownsend/>
- Get a free scientific calculator for the PC: <http://www.allersoft.com/allercalc.htm>
- Software for the TI calculators, including the calculator emulator for the PC, VTI.exe, can be found at <http://www.ticalc.org/>
- Performs integrals you type in: <http://www.integrals.com/>
- Try my web site (not verified for a while so some links might be bad):
<http://uhaweb.hartford.edu/ltownsend/GeneralMathlinks.html>
- On line differential equation solver URLs are given in
<http://answers.yahoo.com/question/index?qid=20081025133837AAI2UMN>