

The Sheet That Should Be Handed Out

The First Day Of Class

Intermediate Differential Equations

Spring 2014

General Stuff

The Course(s): Intermediate Differential Equations, MA 420 and MA 520

Prerequisites: MA 201 (Calc. C), MA 244 (Intro. to Linear Algebra) and MA 238 (Applied Differential Equations).

The Text: The instructor's online notes.

Class Meets: Monday, Wednesday & Friday, 12:45 to 1:40, in Shelby Center 219

Class Web Site: www.math.uah.edu/howell/DE2

About Your Instructor

Instructor: Prof. Ken Howell

Office: Shelby Center 201- B (phone: 256-824-6410; email: howell@math.uah.edu)
(Email is a very good way to contact me. I check my email regularly everyday, even on the weekends, whether I'm on campus or not.)

Office Hours: Monday 11:05 – 12:00 and 1:50 – 3:00
Wednesday 11:05 – 12:00 and 1:50 – 3:00
Friday 11:05 – 12:00
(*other hours by appointment*)

Instructor's Home Phone (to be used only if you really, really have to): 256-880-7040
(But consider email, instead. You're much less likely to catch me at an awkward moment.)

MA 420 / MA 520 — What's the Difference?

While the same basic material will be covered for both MA 420 and MA 520, students expecting to receive credit for MA 520 should also expect to cover additional (assigned) topics from the text. These students should also expect more challenging problems in their homework assignments and exams.

Course Content

Goals and Objectives: This is a continuation of your basic introductory course on differential equations. The main goals and objectives are for you to learn more advanced theory and methods for dealing with ordinary differential equations — learning this material with enough understanding to intelligently use it in

applications arising in your own particular fields of study. The material covered in this course will also reinforce your knowledge of fundamental concepts of applied analysis from previous courses, and prepare you for further courses in partial differential equations and dynamical systems.

What We Will Learn: Here is a thumbnail syllabus for the course:

- I. Review: *A very brief review of certain elements of the basic theory and methods for differential equations, followed by a brief review of infinite series.*
- II. Series Solutions: *Using power series to solve differential equations, and determining the validity of the series solutions. Includes a complete development of the method of Frobenius.*
- III. Systems of Differential Equations:
 - A. General Introduction: *Basic definitions and ideas. Setting up systems, direction fields and trajectories.*
 - B. Linear Systems: *Homogeneous and (if time allows) nonhomogeneous systems of differential equations. Emphasis will be on the “matrix formulations” and the relevance of the corresponding eigenvalues.*
 - C. Nonlinear Systems: *Analyzing nonlinear systems. Phase plane analysis, critical points, stability, etc.*
- IV. Boundary-Value Problems: *An introduction to boundary-value problems and the Sturm-Liouville theory. Includes discussion of the orthogonality and completeness of the sets of eigenfunctions, and a development of the classical Fourier, Bessel and Legendre series expansions of arbitrary functions.*

Grading

Exams: There will be three tests (100 pts. each) and one final (200 pts.)

Graded Homework: Tons of homework will be given, and I will occasionally ask you to turn in some for grading. Your total homework grade will count as one test grade.

Warning: I probably will not tell you which homework problems are to be handed in when I assign them. Instead I may just walk into class and say “Here’s a list of problems you should have finished by now – hand them in at the start of the next class meeting.” (Naturally, I will choose the very problems you haven’t yet done.)

Computing Your Grade: The graded homework determines 1/6 of your grade, as does each test. The remaining 1/3 of your term grade comes from the final.
(By the way, I do assign +/- grades when, in my judgment, they are appropriate.)

The Final: 11:30 to 2:00 on Friday, May 2, 2014.

Stuff I Should Not Have To Tell You But This Is Not A Perfect World And Someone Will Probably Complain If The Following Is Not Included

Electronics in the Classroom: All cell phones, ipods, iphones, ipads, ipeeps, walky-talkies, blackberries and other electronic fruit, game machines, and all other gadgets of communication and/or entertainment that can be picked up and thrown against the wall are to be turned off during class. If you have a good reason to leave your phone on, ask permission of the instructor.

Guns in the Classroom: No, don't bring any guns, swords, explosives, maces, battle axes, trebuchets, or other obvious weapons to class. Nail files, combs, pointy pencils and ordinary pocket knives are okay.

Pets in the Classroom: Gerbils are strictly forbidden.

Academic Integrity: General guidelines concerning "academic integrity" can be found in the Code of Student Conduct chapter of the Student Handbook. Any work you hand in for a grade must be your own work!

Disabilities: This instructor and the University of Alabama in Huntsville will make reasonable accommodations for students with documented disabilities. If you need support or assistance because of a disability, you may be eligible for academic accommodations. Students should identify themselves to the Disability Support Office (256-824-6203, Madison Hall 136, dssproctor@uah.edu) and their instructor as soon as possible to coordinate accommodations.

Complaint Policies: If you have difficulties or complaints related to this course, your first action usually should be to discuss them with me (the instructor). If such a discussion would be uncomfortable for you or fails to resolve your difficulties, you should contact Professor Li, Chair of the Department of Mathematical Sciences. Professor Li's office is SC 258-A. His telephone number is 256-824-6470. If you still are unsatisfied, you should discuss the matter with Dr. Daniel Rochowiak, Associate Dean of the College of Science. Dean Rochowiak's office and telephone number are MSB C206 and 256-824-6844.

If you feel it necessary to go beyond the Associate Dean, then the chain of complaint would be the Dean, the Provost, the University President, the Governor of Alabama, the President of the United States of America, and, finally, God.

UAlert System: The University has the UAlert emergency notification system to warn you of imminent danger through emails, voice mail and text messages. Warnings are automatically sent to all campus email addresses. To also receive text and/or voice message alerts, you must enroll and provide the appropriate contact information (which is kept confidential). For more information and to enroll, visit the UAlert web site, <http://ualert.uah.edu> .