MAT275. Modern Differential Equations, SLN 72730  
Syllabus, Fall 2011

Texts:

Instructor: Wenbo Tang  
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Meeting Schedule: T Th 1:30PM-2:45PM, SS 229.  
Office hours: T Th 11:30pm-1:20pm (tentative) and by appointment, at PSA 837  
Class webpage: On Blackboard

Prerequisites:
Credit is allowed for only MAT 275 or 274 toward a mathematics degree. Pre-requisites: MAT 266 or MAT 271 with a C or better

Calculators:
Calculators are allowed during the tests and exams but you may not find them too helpful.

Lab Sessions
Lab sessions will be handled separately and will not coincide with normal lecture times. However, we will not meet for four normal lecture sessions to make up for the lab hours.

Description:
Catalog Description: Introduces differential equations, theoretical and practical solution techniques. Applications. Problem solving using MATLAB.
Extended Description: In this course students will learn applied methods dealing with first order ODEs (linear/nonlinear) and linear system of ODEs in higher dimensions. Tools include separation of variables, integrating factors, methods for special first order nonlinear equations, Laplace transform, numerical solutions, etc. Patterns of solutions based on different types of differential equations are recognized by learning and working on examples. Essential topics include:
1. First order equations
   Modeling, identification of equations, separation of variables, integrating factors, nonlinear first order equations, forced equations
2. Second order equations
   Modeling, problem solving for unforced/forced linear second order ODEs. Boundary value problems.
3. Laplace transform
   Fundamentals of Laplace transform, applications to linear ODEs.
4. System of first order linear equations
   Reducing a higher order ODE to a system of first order ODEs. Problem solving.
5. Numerical methods using MATLAB
   Explicit and implicit Euler’s methods.

Content Goals:
In this class we will develop skills to solve ordinary differential equations using basic methods
and integral transforms. The methods depend highly on the shape of the differential equations. We will walk through different methods appropriate for different types of equations through examples, group exercises and homework assignments.

**Pedagogical Goals:**
1. Classify order, linearity and homogeneity of ODE
2. Know about mathematical modeling of physical phenomena using differential equations
3. Understand the physical meaning of terms and solutions in the differential equations constructed. Know the difference in methods between forced/unforced problems. Have a solid mastery of linear systems of first order ODEs
4. Have a solid mastery of Laplace transform
5. Numerical programming capabilities.

**Homework assignments and grading:**
Weekly homework assignments are due at the beginning of Thursday classes. Problem sets are mostly from the textbook with occasional instructor additions. Collaboration for homework by teams of size at most three is encouraged but not required. **Each member must submit his/her own copy of homework.** Please make sure that you have understood all contents submitted and expect in-class presentation of your solutions. Please write as clearly as possible to allow proper consideration of your credit. **Late homework only accepted with legitimate reason and within one week of the due date.** Also, late homework is subject to a 40% mark down.

Break down of your final grade: Homework: 20%; Lab: 20%; two tests: 20% each; final: 20%. In-class presentation: 0.1% bonus for each.

Grading scales: >97 A+, 94-96.9 A, 90-92.9 A-, 85-89.9 B+, 80-84.9 B, 75-79.9 B-, 70-74.9 C+, 65-69.9 C, <65 D.

**How to survive/thrive**
Attending every class and complete homework problems regularly are essential to survival. In addition, the best way to be successful is to actively engage in in-class discussions. Forming study groups and use of office hours are strongly encouraged.

**Final Exam make up policies**
The final exam schedule listed in the Schedule of Classes will be strictly followed. Except to resolve those situations described below, no changes may be made in this schedule without prior approval of the Dean of the college in which the course is offered. Under this schedule, if a conflict occurs, or a student has more than three exams on one day, the instructors may be consulted about an individual schedule adjustment. If necessary, the matter may be pursued further with the appropriate dean(s). This procedure applies to conflicts among any combination of Downtown Phoenix campus, Tempe campus, Polytechnic campus, West campus, and/or off campus class.

Make-up exams will NOT be given for reasons of a non-refundable airline tickets, vacation plans, work schedules, weddings, family reunions, and other such activities. Students should consult the final exam schedule before making end-of-semester travel plans.
Weekly schedule (subject to change):
8.18 Introduction, 1.1
8.22, 8.25 1.2, 1.3, 1.4
8.30, 9.1 1.5, 1.6; Matlab Lab 1, no class on 9.1
9.6, 9.8 3.1, 3.2
9.13, 9.15 3.3, 3.4; Matlab Lab 2
9.20, 9.22 3.5, 3.6
9.27, 9.29 3.8; Matlab Lab 3, no class on 9.29
10.4, 10.6 Group exercise, review, T1
10.11, 10.13 4.1; Matlab Lab 4
10.18, 10.20 7.1, 7.2
10.25, 10.27 7.3, Matlab Lab 6, no class on 10.27
11.1, 11.3 7.4, 7.5
11.8, 11.10 7.6, Matlab Lab 7, no class on 11.10
11.15, 11.17 Group exercise, review, T2
11.22 5.1, 5.2
11.29, 12.1 5.4, 5.5
12.6 Review, Q&A
12.13 12:10-2:00PM Final, location TBA

ACADEMIC DISHONESTY!
In the “Student Academic Integrity Policy” manual, ASU defines “Plagiarism’ [as] using another’s words, ideas, materials or work without properly acknowledging and documenting the source. Students are responsible for knowing the rules governing the use of another’s work or materials and for acknowledging and documenting the source appropriately.” You can find this definition at:
http://www.asu.edu/studentaffairs/studentlife/judicial/academic_integrity.htm#definitions

Academic dishonesty, including inappropriate collaboration, will not be tolerated. There are severe sanctions for cheating, plagiarizing and any other form of dishonesty.