

Differential Equations and Linear Algebra

Mathematics 2250-1

Summer 2009

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Office Hour: Wednesdays 8:30-9:30 am, and by appointment.

Texts: *Differential Equations & Linear Algebra* (3rd Ed.), by C.Henry Edwards & David E. Penney. Also required: U. of Utah Custom Supplement, ISBN: 978-0-558-15083-9.

Course Description: This is a hybrid course which teaches the allied subjects of linear algebra and differential equations. These topics underpin the mathematics required for most students in the Colleges of Science, Engineering, Mines & Earth Science. The material of the course will introduce differential equations, and how they are used to model problems arising in engineering and science. Linear algebra is introduced as a tool for analyzing systems of differential equations, as well as standard linear equations. Computer projects will be assigned to enhance the material. *Prerequisites:* MATH 1210/1220 and MATH 2210 or PHYS 2210 or 3210, MATH 1250/1260; 1270/1280. Fulfills Quantitative Reasoning (Math & Stat/Logic).

Grades and Exams:

- (15%) **Homework:** Approximately, one assignment will be due every week. The problems will be posted online, with due dates, as they are assigned. If assignment contents/due dates change during the semester, announcements will be given in class as well as posted online. Problems will be assigned directly from the book, and a sample of them will be graded. *Absolutely no late assignments will be accepted.*
- (20%) **Computer Projects:** Four computer projects will be assigned through the semester. Each will be related to current classroom material. The projects should be completed in the computer algebra system **Maple** and will be useful for helping us extend our understanding of the material, as well as work through interesting applications. Tutorials and **Maple** practice sessions will be provided. If you do not have **Maple** on your home computer, the math lab in LCB and the tutoring center have computers that you can use.
- (40%) **Exams:** There will be two 50-minute midterms over the course of the semester. Tentative exam dates can be found in the proposed schedule below. If the exam dates are changed for any reason, announcements will be made in class as well as posted online. *No exams will be dropped. There will be exams/exam portions where calculators are not allowed.*
- (25%) **Final Exam:** The final exam is scheduled for Thursday, Aug 6 from 7:30-9:30 am. The exam will be cumulative.
- **Grades:** I anticipate final grades will fall in the standard grading scale, i.e. ≥ 90 for an A, 80 – 89 for a B, etc. with \pm at the fringes of these intervals and determined by the general performance of the class. Even if the grades are curved in the end, *if you do not successfully complete at least 50% of the course material, you should not expect a passing grade in this course.*

Makeup Policy: Alternate exam dates can be arranged for participants in University sponsored activities which prevent the student from being in class, or students with disabilities falling under the ADA. Such students should contact me early in the semester about their position and note that *all exams must be completed by the scheduled exam date*. Make-up exams in general will be given in extenuating circumstances, and requests for such must be made no later than 2 weeks before the scheduled exam. I understand extreme circumstances may arise unexpectedly and such necessary absences will be handled on a case-by-case basis. Note that documentation will be requested in these situations and I appreciate as much advance notice as possible.

Tentative Course Outline:

May	18-22	1.1-1.4	First Order Differential Equations
	22		CLASS HELD IN JTB 110, one time only
	25		MEMORIAL DAY
	26-29	1.5, 2.1-2.3	Mathematical Models & Numerical Methods
June	27		LAST DAY to drop classes
	1		LAST DAY to register
	1-5	3.1-3.4	Linear Systems and Matrices
	8-12	3.5-3.6,4.1-4.2	Inverses, Determinants and applications, Vector spaces
	15-19	4.3-4.4,4.7	Linear combinations, Bases, General vector spaces
	22-24	4.4,4.7,5.1	Bases, General vector spaces, Second order equations
	26		EXAM I, Chapters 1-4
	26		LAST DAY to withdraw
July	29-30	5.2-5.3	General solutions, Homogeneous Equations
	1	5.4	Mechanical vibrations
	3		INDEPENDENCE DAY
	6-10	5.5-5.6, 3.7	Undetermined Coefficients, Forced Oscillations, RLC circuits
	13-17	10.1-10.4	Laplace Transform Methods
	20-22	10.5, 6.1-6.2,7.1	Forcing functions (survey),Eigenvalues, First order systems
	24		PIONEER DAY
	27		EXAM II, Chapters 5, 10
August	28-31	7.2-7.5	Linear Systems of Differential Equations
	3-5	9.1-9.4	Nonlinear systems and phenomena
	5		LAST DAY OF CLASSES
	6		FINAL EXAM, 7:30-9:30 am

*This schedule is quite ambitious even for a 15 week semester! Consequently the pace of the lectures will be fast, so you **must** ask questions if you find anything I say confusing. Additionally, doing as many exercises as possible will help reinforce the concepts I introduce in lecture as well as make you technically proficient.*

Nondiscrimination and Disability Access Statement: The University of Utah is fully committed to policies of nondiscrimination and equal opportunity, and vigorously pursues affirmative action in all programs, activities, and employment with regard to race, color, national origin, sex, age, and status as a person with a disability. Religion, sexual orientation, and status as a disabled veteran or veteran of the Vietnam era also are protected under nondiscrimination and equal opportunity employment policies. The University seeks to provide equal access to its programs, services and activities for people with disabilities. Reasonable prior notice is needed to arrange accommodations. Students should call 801-581-5020 or 801-585-1813 (both are TDD). Evidence of practices not consistent with these policies should be reported to the Employee Relations/Dispute Resolution Office, 801-581-8365 (voice or TDD). If you require special accommodations under the ADA please inform me through official channels early in the semester.