MTH333
Differential Equations
MWF 12:15pm–1:10pm, Rohr Science 236

Instructor: Katie Rainey, Ph.D.
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Email communication is best. Please include 'MTH333' in the subject line in any email you send me about the course.

Details in this syllabus are subject to change at at my discretion.

Course Description: Ordinary differential equations, solutions by analytical and numerical methods in the context of real-world applications. A brief introduction to partial differential equations and Fourier series.
Prerequisite: Calculus III (MTH274).

Text: *Fundamentals of Differential Equations*, Eighth Edition

Author: Nagle, Saff and Snider

Other Requirements: There will be occasional programming assignments. Access to MATLAB® or similar software is required. Freemat and Octave are two free alternatives to MATLAB, either of which will suffice for this course. You are welcome to work the programming assignments in other languages/programs if you like (Python is another free alternative, but it is not exactly like MATLAB), but they will be simplest in something like MATLAB.

Course Goals:
Students should gain the ability to properly identify types of differential equations and apply a wide range of analytical methods for solving differential equations. Students should be able to apply the basic numerical methods for solving differential equations.

Examinations:
There will be two midterms and a final exam. The final exam is comprehensive and will be held on **Monday, May 4, 2015, 10:30am–1:00pm, Rohr Science 236**. All or some portion of the exams may be take-home, in which case they will be due on the date of the scheduled exam.

Projects:
There will be several projects throughout the semester. These are designed to improve your ability to communicate technical ideas and to give you a change to apply differential equations to real world problems.

Format for projects. Assignments collected must be prepared in a style suitable for grading. The projects will be graded based on clarity and writing quality.

- The solutions must be well-organized and easy to follow.
- The work must be typed (use of the LaTeX typesetting language is highly recommended, details below).
- Complete solutions must be written for problems (not just answers); solutions must be clearly marked. Use complete sentences to answer questions.

Homework:

Homework sets will be assigned for each class period and will be due at the beginning of the class period on the Wednesday of the following week (usually). *Doing all of the assigned homework before the next class will almost certainly ensure that you successfully master the course material. The exams will be like the homework; there should be no surprises.*

You must be persistent in solving homework problems; when you need help, ask me, fellow classmates, other friends, the internet, or your favorite MICS professor, but be sure to keep up with the pace of the class.

Homework sets (unlike projects) are not required to be typed, though it is strongly recommended that you do so (see section on LaTeX below).

Office Hours

I am an adjunct instructor employed full-time off-campus. As such, I will not hold regularly scheduled office hours, but I will be available to meet with you by appointment (usually before or after class). Do not hesitate to ask questions during lecture, or to approach me afterwards.

Typesetting With LaTeX

LaTeX (I pronounce it "lah-tek") is a free document preparation system widely used in academia and industry for typesetting scientific documents. Not only does it make it much easier (in my opinion) to write math than in, for example, Microsoft Word, but it looks much better too (also in my opinion). The assigned projects are required to be typed; I recommend you also type your homework sets and take-home exams. You may use your favorite word processing solution to do this, but my recommendation is LaTeX.

Internet searches will reveal many helpful resources for getting started with LaTeX. This link, for example, contains a useful template for typing up homework sets.

`https://joshldavis.com/2014/02/12/doing-your-homework-in-latex/`

Grade Distribution:

Projects	20%
Homework	15%
Midterm Exams	40%
Final Exam	25%

Letter Grade Distribution:

>= 93.00	A	73.00 - 76.99	C
90.00 - 92.99	A-	70.00 - 72.99	C-
87.00 - 89.99	B+	67.00 - 69.99	D+
83.00 - 86.99	B	63.00 - 66.99	D
80.00 - 82.99	B-	60.00 - 62.99	D-
77.00 - 79.99	C+	<= 59.99	F

Course Policies:

- In-class exams are closed-book, though you will be allowed a "cheat sheet" (one sheet of paper, no larger than 8.5" × 11", on both sides of which you may write or type).
- A written assignment or computer assignment is late if it is not received at or before the beginning of class on the due date. Late work will not be accepted.
- Make-up tests will be given only by arrangement with the instructor for reasons of documented emergency.
- There is a strong correlation between grade and attendance. It is your responsibility to attend lectures. If more than 20% of the total number of class meetings is missed for any reason you may be de-enrolled from the course as per the undergraduate catalog.

Academic Accommodation:

While all students are expected to meet the minimum standards for completion of this course as established by the instructor, students with disabilities may require academic accommodations. At Point Loma Nazarene University, these students are requested to file documentation during the first two weeks fo the semester with the Academic Support Center (ASC), located in the Bond Academic Center. This policy assists the University in its commitment to full compliance with Section 504 of the Rehabilitation Act and the Americans with Disabilities Act. Section 504(a) prohibits discrimination against students with special needs and guarantees all qualified students equal access to and benefits of PLNU programs and activities. Once the student files documentation, the ASC will contact the student's instructors and provide written recommendations for reasonable and appropriate accommodations to meet the individual learning needs of the student.

Cheating Policy

A student who is caught cheating on an exam or an assignment will receive a zero on the assignment and may receive an "F" for the semester as per the guidelines in the course catalog. Cheating consists of using work other than your own and not citing it, storing answers on calculators or other devices for exams, obtaining copies of old exams, etc.

You may work on homework and projects for this course in groups, however your answers must show enough variation from the work of others to indicate that it was not merely copied.

Tentative course outline:

See table on next page. Outline is tentative and subject to change.

Week	Dates	Subject	Sections
	T 1/13	Introduction	1.1,2
1	W 1/14	Introduction	1.3,4
	F 1/16	First Order Differential Equations	2.2
	M 1/19	NO CLASS	
2	W 1/21	First Order Differential Equations	2.3
	F 1/23	First Order Differential Equations	2.4
	M 1/26	First Order Differential Equations	2.5,6
3	W 1/28	Mathematical Models and Numerical Methods	3.2,3
	F 1/30	Project 1	
	M 2/2	Mathematical Models and Numerical Methods	3.4
4	W 2/4	Mathematical Models and Numerical Methods	3.5,6
	F 2/6	Midterm Review	
	M 2/9	Midterm 1	Covers through Ch. 3
5	W 2/11	Linear Second-Order Equations	4.1,2
	F 2/13	Linear Second-Order Equations	4.3
	M 2/16	Linear Second-Order Equations	4.4,5
6	W 2/18	Linear Second-Order Equations	4.6
	F 2/20	Linear Second-Order Equations	4.9,10
	M 2/23	Introduction to Systems	5.1,2
7	W 2/25	Introduction to Systems	5.3
	F 2/27	Project 2	
	M 3/2	Introduction to Systems	5.4,6
8	W 3/4	Laplace Transforms	7.2
	F 3/6	Laplace Transforms	7.3
		SPRING BREAK	
	M 3/16	Laplace Transforms	7.4
9	W 3/18	Laplace Transforms	7.5
	F 3/20	Laplace Transforms	7.7
	M 3/26	Laplace Transforms	7.8,9
10	W 3/25	Midterm Review	
	F 3/27	Midterm 2	Covers through Ch. 7
	M 3/30	Series Solutions	8.1
11	W 4/1	Series Solutions	8.2
	F 4/3	NO CLASS	
	M 4/6	NO CLASS	
12	W 4/8	Series Solutions	8.3
	F 4/10	Series Solutions	8.4
	M 4/13	Project 3	
13	W 4/15	Partial Differential Equations	10.1,2
	F 4/17	Partial Differential Equations	10.3
	M 4/20	Partial Differential Equations	10.4
14	W 4/22	Partial Differential Equations	10.5
	F 4/24	Partial Differential Equations	10.6
	M 4/27	Partial Differential Equations	10.7
15	W 4/29	TBD	
	F 5/1	Final Exam Review	
	M 5/4	FINAL EXAM	Covers all course material