MTH333 Differential Equations (3 units)
MWF 7:25-8:20 LA102

Instructor: Ryan Botts, Ph.D.   **Office**: Rohr Science 228
Office Hours: M 8:30-9:30 & 1-4, WF 8:30-9:30   **Phone**: 619.849.2968
                     TTh 9-10 & 1-2   **Email**: ryanbotts@pointloma.edu

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.

Prerequisites: MTH274 Calculus III

Required Materials
Textbook: Nagle, Saff and Snider, *Fundamental of Differential Equations 8th ed.*
ISBN: 978-0321747730

Computational tools: Throughout this course there will be places where we use technology to solve problems, thus you should have access to software such as MATLAB, FreeMat, Octave, R, etc.
Other: 3 hamsters and a lobster

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.

Learning Outcomes
Students will be able to apply their mathematical knowledge to solve problems.
Students will be able to use technology to solve problems.

Examinations
There will be two midterms and a final exam. The final is comprehensive and will be held on **Friday May 5, 2017 from 7:30-10 am.** 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 chance to apply differential equations to real world problems.

Grading Policies
Grades will be weighted in the following manner:
Projects(20%), Homework (15%), Midterms (40%), Final (25%)

Approximate minimal percentages required to obtain a given grade are:

Grading Scale in percentages	A	B	C	D
+		(87.5, 90)	(77.5, 80)	(67.5, 70)
	[92.5, 100]	[82.5, 87.5)	[72.5, 77.5)	[62.5, 67.5)
-	[90, 92.5)	[80, 82.5)	[70, 72.5)	[60, 62.5)

- **Late work**. A written assignment or computer assignment is late if it is not received at the beginning of class on the due date. Late work will not be accepted. Make-up tests (or the exam) will be given by prior arrangements with the instructor or for a documented emergency. All late work (exams, homework or projects) will receive no credit.

- **Format for Projects**. Assignments collected must be prepared in a style suitable for grading. The projects will be graded on clarity and writing quality.
    - the organization must be easy to follow
    - the work must be typed
    - complete solutions must be written for problems (not just answers); solutions must be clearly marked
    - use complete sentences to answer questions

University Mission
Point Loma Nazarene University exists to provide higher education in a vital Christian community where minds are engaged and challenged, character is modeled and formed, and service is an expression of faith. Being of Wesleyan heritage, we strive to be a learning community where grace is foundational, truth is pursued, and holiness is a way of life.

Department Mission
The Mathematical, Information, and Computer Sciences department at Point Loma Nazarene University is committed to maintaining a curriculum that provides its students with the tools to be productive, the passion to continue learning, and Christian perspectives to provide a basis for making sound value judgments.

Attendance
Attendance is expected at each class session. In the event of an absence you are responsible for the material covered in class and the assignments given that day.

Regular and punctual attendance at all classes is considered essential to optimum academic achievement. If the student is absent from more than 10 percent of class meetings, the faculty member can file a written report which may result in de-enrollment. If the absences exceed 20 percent, the student may be de-enrolled without notice until the university drop date or, after that date, receive the appropriate grade for their work and participation. See http://catalog.pointloma.edu/content.php?catoid=24&navoid=1581#Class_Attendance in the Undergraduate Academic Catalog.

Class Enrollment
It is the student's responsibility to maintain his/her class schedule. Should the need arise to drop this course (personal emergencies, poor performance, etc.), the student has the responsibility to follow through (provided the drop date meets the stated calendar deadline established by the university), not the instructor. Simply ceasing to attend this course or failing to follow through to arrange for a change of registration (drop/add) may easily result in a grade of F on the official transcript.

Academic Accomodations

If you have a diagnosed disability, please contact PLNU's Disability Resource Center (DRC) within the first two weeks of class to demonstrate need and to register for accommodation by phone at 619-849-2486 or by e-mail at DRC@pointloma.edu. See Disability Resource Center for additional information. For more details see the PLNU catalog: http://catalog.pointloma.edu/content.php?catoid=24&navoid=1581#Academic_Accommodations

Students with learning disabilities who may need accommodations should discuss options with the instructor during the first two weeks of class.

Academic Honesty

Students should demonstrate academic honesty by doing original work and by giving appropriate credit to the ideas of others. Academic <u>dis</u>honesty is the act of presenting information, ideas, and/or concepts as one's own when in reality they are the results of another person's creativity and effort. A faculty member who believes a situation involving academic dishonesty has been detected may assign a failing grade for that assignment or examination, or, depending on the seriousness of the offense, for the course. Faculty should follow and students may appeal using the procedure in the university Catalog. See http://catalog.pointloma.edu/content.php?catoid=24&navoid=1581#Academic_Honesty for definitions of kinds of academic dishonesty and for further policy information.

Final Exam

The final exam date and time is set by the university at the beginning of the semester and may not be changed by the instructor. This schedule can be found on the university website and in the course calendar. No requests for early examinations will be approved. Only in the case that a student is required to take three exams during the same day of finals week, is an instructor authorized to consider changing the exam date and time for that particular student.

Copyright Protected Materials

Point Loma Nazarene University, as a non-profit educational institution, is entitled by law to use materials protected by the US Copyright Act for classroom education. Any use of those materials outside the class may violate the law.

Credit Hour

In the interest of providing sufficient time to accomplish the stated course learning outcomes, this class meets the PLNU credit hour policy for an 3 unit class delivered over 15 weeks. Specific details about how the class meets the credit hour requirements can be provided upon request.

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	8	9	10 Sec 1.1 Intro.	11 Sec. 1.2-1.3 Intro.	12	13 Sec. 2.2 1st Order Eqn.	14
	15	16 **Martin Luther King Jr. Day** (No Classes)	17	18 Sec. 2.3-2.4 1st Order Eqn.	19 S	20 Sec. 2.5 1st Order Eqn.	21
	22	23 Sec. 2.6 1st Order Eqn.	24	25 Sec. 3.2 & 3.4 Modeling	26	27 Sec. 1.4 & 3.6 Numerical Methods	28
	29	30 Review	31	1 Midterm 1	2	3 Sec. 4.1 Linear 2nd Order	4
February	5	6 Sec. 4.2 Linear 2nd Order	7	8 Sec. 4.3 Linear 2nd Order	9	10 Sec. 4.4 Linear 2nd Order	11
	12	13 Sec. 4.5 Linear 2nd Order	14	15 Sec. 4.6 Linear 2nd Order	16	17 Sec. 4.9 Linear 2nd Order	18
	19	20 Sec. 4.10 Linear Linear 2nd Order	21	22 Sec. 5.1-5.2 Intro. To Systems	23	24 Sec. 7.2 Laplace Trrm. (Proj 1 Due)	25
	26	27 Sec. 7.3 Laplace Trrm.	28	1 Sec. 7.4 Laplace Trrm.	2	3 Sec. 7.5 Laplace Trrm.	4
March	5	6 Spring	7 ————	8 Break	9 ————	10 Week	11
	12	13 Sec. 7.6 Laplace Trrm.	14	15 Sec. 7.7 Laplace Trrm.	16	17 Sec. 7.8 Laplace Trrm.	18
	19	20 Sec. 7.9 Laplace Trrm.	21	22 Review	23	24 Midterm 2 Last Day to Drop	25
	26	27 Sec. 8.1 Series Soln.	28	29 Sec. 8.2 Series Soln.	30	31 Sec. 8.3 Series Soln.	1
April	2	3 Sec. 8.4 Series Soln.	4	5 Sec. 8.5 Series Soln.	6	7 Sec. 8.6 Series Soln.	8
	9	10 Sec. 10.1 PDE's	11	12 Sec. 10.2 PDE's	13 Easter Recess	14 Easter Recess	15
	16 **Easter**	17 Easter Recess	18	19 Sec. 10.3 PDE's	20	21 Sec. 10.4 PDE's	22
	23	24 Sec. 10.5 PDE's	25	26 Sec. 10.6 PDE's	27	28 \ Review	29
	30	1	2	3	4	5 **Final 7:30-10 a.m.**	6

Homework problems

Section	Problems
1.1	1-17
1.2	1-8,15,21,23-28,31
1.3	1,3
2.2	1-6 all, 7-23 odd, 30,31,34,35
2.3	1-6 all, 7-21 odd, 31-33 all
2.4	1-8 all, 9-25 odd, 35,36
2.5	1-6, 7-13 odd
2.6	21-27 odd, 35
3.2	1,3,9,12,13
3.3	1-9 odd
3.4	1,7,11,21,25
3.5	1,7
1.4	1,2,7,15
3.6	1,5,9,19
4.3	1-8 all, 9,10,11,13,21,22,23,29,33(a,b)
4.4	1-8 all, 10,12,13,17,20,27-32
4.5	1,4,5,9-16 all, 18,19,23,25,27,43
4.6	3,4,6,7
4.7	9,19
5.2	1-5,7,19,22,23,31
7.3	1,3,6,7,10,21,31
7.4	1-10,31,33
7.5	2,3,15,18
7.6	1,5,14,19,24,31,33,36,37
8.2	1,9,10,11,17,18,30,31,32
8.3	11,13,16,19,21,25