MTH373 (3 units)

Point Loma Nazarene University

Department of Mathematical, Information and Computer Sciences

Fall 2016

MTH373-1	Mathematical Modeling
Class Time	TR 11:00 am – 12:15 am F 7:25 am – 9:25 am
Location	**LA 1**
Instructor	Jesús Jiménez, Ph.D.
Office	RS 218
Phone	619-849-2634
Email	jjimenez@pointloma.edu
Office Hours	MWF **11:00 am – 12:00 pm** TR **9:30 am – 10:30 am**
Textbook	Textbook: Mooney, D. and Swift, R. A Course in Mathematical Modeling. ISBN: 0-88385-712-X
Required Materials	Access to Java, Python, Matlab, Excel, R or your favorite programming language and statistical package.
Final Exam	**Tuesday December 13, 10:30am – 1:00 pm**
Course Description	A problem based course that explores mathematical modeling techniques using a variety of computational methods. Also examines how mathematics can be applied to answer specific questions. Includes problems from biology, chemistry, physics, business and other non-mathematical disciplines. Written report and oral presentation are required.

Grade Distribution

Literature Review	200	points
Projects	300	points
Homework & Activities	200	points
Final Project	300	points
Total	1000	points

Grading Scale

	A	B	C	D	F
+		>86%	>76%	>66%	<59%
	>90%	>83%	>73%	>63%	
–	>88%	>80%	>70%	≥59%	

Course Requirements	Prerequisites MTH274 and MTH383, or equivalent.
Final Exam	**Date:** December 13, 2016 at 10:30 am. The Final Exam is a **COMPREHENSIVE** examination.
Final Exam Policy	Successful completion of this class requires taking the final examination **on its scheduled day**. The final examination schedule is posted on the Class Schedules site. No requests for early examinations or alternative days will be approved.
Resources	Library, Computer Lab, Math Tutoring Center

PLNU MISSION: TO TEACH – TO SHAPE – TO SEND

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 becomes an expression of faith. Being of Wesleyan heritage, we aspire 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.

COURSE DESCRIPTION

A problem based course that explores mathematical modeling techniques using a variety of computational methods. Also examines how mathematics can be applied to answer specific questions. It includes problems from biology, chemistry, physics, business and other non-mathematical disciplines. Written report and oral presentation are required.

LEARNING OUTCOMES

- Students will be able to apply their mathematical knowledge to solve problems.
- Students will be able to use technology to solve problems.
- Students will be able to speak about their work with precision, clarity and organization.
- Students will be able to write about their work with precision, clarity and organization.
- Students will collaborate effectively in teams.
- Students will be able to identify, locate, evaluate, and effectively and responsibly use and cite information for the task at hand.
- Students will be able to gather relevant information, examine information and form a conclusion based on that information.
- Students will be able to understand and create arguments supported by quantitative evidence, and they can clearly communicate those arguments in a variety of formats.

GRADING POLICIES

Grades will be computed based on your scores on the following assignments:

- *Literature Reviews (20%)* – There are several literature reviews where you will be asked to read a research paper on a model and give a 5-10 min. presentation on the paper.
- *Projects (30%)* – There will be several projects based on the models we are working on.
- *Homework and activities (20%)* – In class activities may role over into homework, and you may also be assigned a few problems from the text.
- *Final Project (30%)* – Presentation done during final exam time.

LATE WORK POLICY

All assignments are to be submitted/turned in by the beginning of the class session when they are due—including assignments posted in Canvas. Incompletes will only be assigned in extremely unusual circumstances.

PARTIAL EXAMS POLICY

Make-up tests (or the exam) will be given only by arrangement prior to the test (exam) scheduled date with the instructor for reasons of documented emergency.

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 in which a student is registered is considered essential to optimum academic achievement. Therefore, regular attendance and participation in each course are minimal requirements to be met. There are no allowed or excused absences except as approved in writing by the Provost for specific students participating in certain university-sanctioned activities. Excused absences still count toward the 10%-20% limits, but allow students to make up work, quizzes, or tests missed as a result of a university-sanctioned activity. Activities of a unique nature, such as labs or other activities identified clearly on the syllabus, cannot be made up except in rare instances when instructors have given advanced, written approval for doing so. Whenever the number of accumulated absences in a class, for any cause, exceeds ten (10) percent of the total number of class meetings, the faculty member should send an e-mail to the student and the Vice Provost for Academic Administration (VPAA) warning of attendance jeopardy. If more than twenty (20) percent of the total number of class meetings is reported as missed, the faculty member or VPAA may initiate the student's de-enrollment from the course without further advanced notice to the student. If the date of de-enrollment is past the last date to withdraw from a class, the student will be assigned a grade of W or WF consistent with university policy in the Grading section of the catalog. There are no refunds for courses where a de-enrollment was processed. For more details see the PLNU catalog: http://catalog.pointloma.edu/content.php?catoid=14&navoid=1089#Class_Attendance

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 ACCOMMODATIONS

While all students are expected to meet the minimum academic standards for completion of their courses as established by the instructors, students with special needs may require academic accommodations. At Point Loma Nazarene University, students requesting academic accommodations must file documentation with the Disability Resource Center (DRC), located in the Bond Academic Center. Once the student files documentation, the Disability Resource Center contacts the student's instructors and provides written recommendations for reasonable and appropriate accommodations to meet the individual needs of the student. This policy assists the university in its commitment to full compliance with Section 504 of the Rehabilitation Act of 1973, the

Americans with Disabilities (ADA) Act of 1990, and ADA Amendments Act of 2008, all of which prohibit discrimination against students with special needs and guarantees all qualified students equal access to the benefits of PLNU programs and activities. For more details see the PLNU catalog:
http://catalog.pointloma.edu/content.php?catoid=14&navoid=1089#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

The Point Loma Nazarene University community holds the highest standards of honesty and integrity in all aspects of university life. Any violation of the university's commitment is a serious affront to the very nature of Point Loma's mission and purpose. Violations of academic honesty include cheating, plagiarism, falsification, aiding academic dishonesty, and malicious interference. The details of PLNU's meaning of each of these words can be found in the PLNU catalog at:
http://catalog.pointloma.edu/content.php?catoid=14&navoid=1089#Academic_Honesty

A student remains responsible for the academic honesty of work submitted in PLNU courses and the consequences of academic dishonesty beyond receipt of the final grade in the class and beyond the awarding of the diploma. Ignorance of these catalog policies will not be considered a valid excuse or defense. Students may not withdraw from a course as a response to a consequence.

A student who is caught cheating on any item of work will receive a zero on that item and may receive an "F" for the semester. See the PLNU Catalog for a further explanation of the PLNU procedures for academic dishonesty (http://catalog.pointloma.edu/content.php?catoid=14&navoid=1089#Academic_Honesty).

FINAL EXAM

10:30 am -- 1:00 pm on Tuesday December 13, 2016.

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. 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 change the exam date and time for that particular student.

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 a 3 unit class delivered over 16 weeks. Specific details about how the class meets the credit hour requirements can be provided upon request.

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.

Tentative Calendar

Week		Tuesday		Thursday
1	30-Aug		1-Sep	Population Model
2	6-Sep	Population Model	8-Sep	Discrete Stochasticity
3	13-Sep	Discrete Stochasticity	15-Sep	**Literature Review 1**
4	20-Sep	Queueing	22-Sep	Queueing
5	27-Sep	**Project 1**	29-Sep	SIR Model
6	4-Oct	SIR Model	6-Oct	**Literature Review 2**
7	11-Oct	Population Demographics	13-Oct	Population Demographics
8	18-Oct	**Project 2**	20-Oct	Project 2
9	25-Oct	Population Demographics	27-Oct	Population Demographics
10	1-Nov	Steady States	3-Nov	**Literature Review 3**
11	8-Nov	Linear Regression	10-Nov	Linear Regression
12	15-Nov	Linear Regression	17-Nov	**Project 3**
13	22-Nov	**Literature Review 4**	24-Nov	**Thanksgiving Break**
14	29-Nov	Group Meeting	1-Dec	Group Meeting
15	6-Dec	Group Meeting	8-Dec	Group Meeting
FINALS	13-Dec	**Final Presentation 10:30 - 1:00**	15-Dec	