Shared Syllabus for Problem Solving

POINT 1902 LOMA NAZARENE UNIVERSITY	Mathematics, Information, and Computer Sciences College of Natural and Social Sciences MTH3003-1 Problem Solving 3 Units Pre – requisites: MTH0099
Summer 2022: May 9 – June 9	

Meeting days: MTWR	Instructor: Jesús Jiménez-Reyes, Professor of Mathematics	
Meeting times: 7:30 am – 9:40 am	Phone: 619-849-2634	
Meeting location: RS 295	Email: jjimenez@pointloma.edu	
Final Exam (RS 295)	Office hours:	T 11:00 am – 12:00 pm, 3:00 – 4:00 pm
June 9th (Thursday) 7:30 am – 10:00 am		R 11:00 am – 12:00 pm, 3:00 – 4:00 pm

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 foundational exploration course whose major goal is to develop the ability to solve non-routine problems through dynamic processes of inquiry and exploration, logical reasoning, making and testing conjectures and investigating implications of conclusions. A study of quantitative reasoning with emphasis on active problem solving and developing connections with other disciplines. Not applicable toward a major in Mathematics.

COURSE LEARNING OUTCOMES

- Students will be able to formulate a mathematical model from a verbal description of a problem.
- Students will be able to solve non-routine problems using logic and quantitative techniques.
- Students will be able to construct solutions to problems using computational techniques

FOUNDATIONAL EXPLORATION

This is a PLNU Foundational Explorations course (a general education course).
PLNU provides a foundational course of study in the liberal arts informed by the life, death, and resurrection of Jesus Christ. In keeping with the Wesleyan tradition, the curriculum equips students with a broad range of knowledge and skills within and across disciplines to enrich major study, lifelong learning, and vocational service as Christ-like participants in the world's diverse societies and cultures.

FOUNDATIONAL EXPLORATIONS LEARNING OUTCOMES

- Students will be able to solve problems that are quantitative in nature.
- Students will be able to formulate a mathematical model from a verbal description of a problem.
- Students will be able to solve non-routine problems using logic and quantitative techniques.
- Students will be able to construct solutions to problems using computational techniques

REQUIRED TEXTS AND RECOMMENDED STUDY RESOURCES
Textbook: Excursion in Modern Mathematics, 9th Edition (Electronic Copy via MyLab and Mastering)
Author: Peter Tannenbaum
Publisher: PEARSON

COURSE CREDIT HOURS INFORMATION
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 5 weeks. Specific details about how the class meets the credit hour is provided below.

Online Quizzes	15.00
Online Homework	20.00
Written Group Homework	15:00
Reading Text	15.00
Watching Videos	25.00
Group Project	4.00
Budget Project	3.00
Class meetings	20.00
Midterms	2.50
Final Exam	2.50
TOTAL	122.00

GRADE COMPONENTS
The grade components are written homework, written tests, online homework, online quizzes, projects, class participation, collaborative activities, discussions, partial exams, and the final examination.

OTHER FACTORS THAT AFFECT GRADES
- **Online Assignments:** Online assignments (online homework and quizzes) will be completed in MyLab and Mastering website. This will be available by purchasing an access code.
- **Collaborative Activities:** This will be peer-reviewed discussions using CANVAS.
- **Group Written Assignments:** Assignments collected must be prepared in a style suitable for grading. The following guidelines are used to determine credit:
    - the organization must be easy to follow
    - the work must be legible
    - complete solutions must be written for problems (not just answers); answers must be clearly marked
    - use complete sentences to answer questions
- **Tests and Final Examination:** Tests and the final exam will include problems and questions over material assigned in the text, readings and handouts, as well as material presented in class. No examination shall be missed without prior consent or a well-documented emergency beyond your control. A score of zero will be assigned for an examination that is missed without prior consent or a well-documented emergency beyond your control. The examination schedule is included in the daily schedule. This instructor does not intend to accept excuses such as poor communication with parents, benefactors, surf team sponsors and/or travel agents. 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. The student must contact each professor in order to work out an alternate time for one of those examinations. Department chairs/school deans and college deans need not be involved in the process of

making this accommodation. Such accommodations and the negotiations necessary to arrange them must be completed at least four weeks prior to the official time of the final examination.

- **Late work:** All assignments are to be submitted/turned in by the beginning of the class session when they are due—including assignments posted in Canvas. Late work need not be accepted. Work accepted late may be assessed a penalty. Make-up tests will be given only by prior arrangement with the instructor for reasons of documented emergency.
- **Incomplete grade:** Incompletes will only be assigned in extremely unusual circumstances. You may request a grade of I (incomplete) only if you are having a passing grade an at least 70% of the course work is completed.

GRADING SCALE

A passing grade requires getting at least 60% in one of the two tests or on the final exam. Grades are based on the number of points accumulated throughout the course. 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]

GRADING DISTRIBUTION

Grade Distribution	
Two Tests at 20% each	40%
Final Exam	25%
Online Homework	8%
Quizzes	5%
Online Pair Discussion	5%
Group Project	5%
Individual Budget Assignment	5%
Group Written Homework	5%
Attendance	2%
Total	100%

STATE AUTHORIZATION

State authorization is a formal determination by a state that Point Loma Nazarene University is approved to conduct activities regulated by that state. In certain states outside California, Point Loma Nazarene University is not authorized to enroll online (distance education) students. If a student moves to another state after admission to the program and/or enrollment in an online course, continuation within the program and/or course will depend on whether Point Loma Nazarene University is authorized to offer distance education courses in that state. It is the student's responsibility to notify the institution of any change in his or her physical location. Refer to the map on State Authorization to view which states allow online (distance education) outside of California.

PLNU ACADEMIC HONESTY POLICY

Students should demonstrate academic honesty by doing original work and by giving appropriate credit to the ideas of others. Academic dishonesty 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 Academic Policies for definitions of kinds of academic dishonesty and for further policy information.

PLNU ACADEMIC ACCOMMODATIONS POLICY

PLNU is committed to providing equal opportunity for participation in all its programs, services, and activities. Students with disabilities may request course-related accommodations by contacting the Educational Access Center (EAC), located in the Bond Academic Center (EAC@pointloma.edu or 619-849-2486). Once a student's eligibility for an accommodation has been determined, the EAC will issue an academic accommodation plan ("AP") to all faculty who teach courses in which the student is enrolled each semester.

PLNU highly recommends that students speak with their professors during the first two weeks of each semester/term about the implementation of their AP in that particular course and/or if they do not wish to utilize some or all of the elements of their AP in that course.

Students who need accommodations for a disability should contact the EAC as early as possible (i.e., ideally before the beginning of the semester) to assure appropriate accommodations can be provided. It is the student's responsibility to make the first contact with the EAC.

PLNU ATTENDANCE AND PARTICIPATION POLICY

Students taking online courses are expected to attend each week of the course. Attendance is defined as participating in an academic activity within the online classroom which includes posting in a graded activity in the course. (Note: Logging into the course does not qualify as participation and will not be counted as meeting the attendance requirement.)

Students who do not attend at least once in any 3 consecutive days will be issued an attendance warning. Students who do not attend at least once in any 7 consecutive days will be dropped from the course retroactive to the last date of recorded attendance.

See Academic Policies in the Undergraduate Academic Catalog. If absences exceed these limits but are due to university excused health issues, an exception will be granted.

Asynchronous Attendance/Participation Definition

A day of attendance in asynchronous content is determined as contributing a substantive note, assignment, discussion, or submission by the posted due date. Failure to meet these standards will result in an absence for that day. Instructors will determine how many asynchronous attendance days are required each week.

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.

SPIRITUAL CARE

Please be aware PLNU strives to be a place where you grow as whole persons. To this end, we provide resources for our students to encounter God and grow in their Christian faith. If students have questions, a desire to meet with the chaplain or have prayer requests you can contact the Office of Spiritual Development

COURSE PHILOSOPHY

The general method of the course is to involve students in "dynamic processes of inquiry and exploration, logical reasoning, making and testing conjectures, and investigating implications of conclusions" [Catalog]. Specifically, the focus is on the processes and tools of quantitative problem solving. Learning what they are and developing ability to use them.

"Today's world is more mathematical than yesterday's, and tomorrow's world will be more mathematical than today's."
"...mathematics...serves as a key to opportunity and careers."[Everybody Counts, p.45, p.3]

"To participate rationally in a world where discussions about everything from finance to the environment, from personal health to politics, are increasingly informed by mathematics, one must understand mathematical methods and concepts, their assumptions and implications." [50 Hours, p.35]

In view of these statements and many other similar ones from national reports, this quantitative experience (MTH 303) has been included as part of the PLNU general education curriculum. Thus, all students will study "major concepts, methods, and applications of quantitative reasoning with emphases on active problem solving" [Catalog].

COURSE APPROACH
The ability to solve problems requires resourcefulness, flexibility, and efficiency in dealing with new obstacles. Research on
teaching and learning problem solving suggests that certain factors are critical to successful problem solving, including resources, heuristics, control, and belief systems [Schoenfeld, 1985].

Resources refer to whatever information problem solvers understand (or misunderstand) that might be brought to bear on a problem.
Heuristic refers to strategies and techniques problem solvers have (or lack) for making progress when working on non-routine problems.
Control refers to the way problem solvers use (or fail to use) the information at their disposal.
Belief systems refer to the problem solver's "world view" of the problem domain, which determines the ways they use the knowledge in the first three categories.

The approach in MTH 303 develops and uses these factors to increase your problem-solving ability. Classroom techniques used include:
the teacher as role model
whole-class problem solving with teacher as control
small-group problem solving with teacher as coach

In addition, you are assigned readings and problems that will help you identify and make progress in the four areas discussed above.

COURSE METHODS
- *Use of groups:* There is almost a century of research showing that academic achievement, productivity, and self-esteem improve dramatically when students work together in groups. This method emphasizes teamwork, cooperation and support by others, rather than isolation and competition in learning.
- *Role of the classroom instructor:* There will be less direct "lecturing" in class than usual, with many questions "answered" by another question to help you work through your own questions and difficulties. You are expected to learn problem solving through active involvement - reading, writing, and explaining to others what you are thinking and doing.

This may require some adjustment in the way you think about teaching and learning. Initially, you may wish for more direct information and answers, but your patience and effort will be rewarded with a deeper understanding and increasing independence in problem solving, as well as confidence in your ability to tackle new problems.

COPYRIGHT PROTECTED MATERIALS:

THE FINAL EXAM IS A COMPREHENSIVE EXAMINATION. (May 4th, Wednesday, 4:30 – 7:00 pm LBRT Station)
Successful completion of this class requires taking the final examination on its scheduled day.
The final exam date, time and place 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.

WRITTEN HOMEWORK PROBLEMS
These assignments are to be written up on paper and uploaded to CANVAS on or before the due date.

Chapter	Page	Problems	Due Date
1	32-34	# 30, 38, 50	1/27/2022
2	64-65	# 58, 64, 60	2/3/2022
4	129	# 26, 34, 40	2/17/2022
5	168	# 46, 54, 56	2/24/2022
6	199	# 40, 44, 52	3/17/2022
7	221-226	# 30, 36, 50	3/24/2022
8	253	# 54, 56, 58	4/7/2022
10	323	# 60, 62, 70	4/28/2022

Comments on homework:

1. This is the minimum amount of homework that is required but you may need to do several odd numbered problems to make sure you get the answer in the textbook.
2. A homework assignment is late if it is not received at the start of class on the due date. No late homework will be accepted except by prior arrangement or with a documented emergency.
3. Please be sure that your homework is stapled together and the problems are in order.
4. Homework will be scored on a combination of completeness and correctness. All work necessary to complete a problem must be shown to earn credit.
5. Start working on your homework early. These problems are difficult and meant to be done a little at a time over the course of a few days.
6. When doing homework, please note it is normal to not be able to do every problem correct on the first attempt. Do not be discouraged, instead seek help.

Daily Schedule					Summer 2022
		Date	In Class	Online Readings and Videos	Online HW and Quizzes
1	Monday	9-May	Chapter 1	Chapter 1 reading	Intro to MyMathLab
				Chapter 1 videos	
2	**Tuesday**	10-May	Chpater 1 and 2	Chapter 2 reading	OA 1
				Chapter 2 videos	
3	Wednesday	11-May	Chapter 2		Quiz 1
			Homework 1		
4	**Thursday**	12-May	**Chapter 4**	Chapter 4 reading	OA 2
				Chapter 4 videos	
	Friday	13-May	No Class		Quiz 2
5	**Monday**	16-May	Chapter 4		
			Homework 2		
6	Tuesday	17-May	Open Lab	Chapter 5 reading	OA 4
				Chapter 5 videos	
7	**Wednesday**	18-May	Chapter 5		Quiz 4
			Homework 4		
8	Thursday	19-May	Exam 1 Chapters 1, 2, 4		
	Friday	20-May	No Class	Chapter 6 reading	OA 5
				Chapter 6 videos	
9	Monday	23-May	Chapter 6	Chapter 7 reading	Quiz 5
			Homework 5, Group Project	Chapter 7 videos	
10	**Tuesday**	24-May	Lab Day		OA 6
11	Wednesday	25-May	Chapter 7	Chapter 8 reading	Quiz 6
			Homework 6	Chapter 8 videos	
12	**Thursday**	26-May	**Chapter 8**		OA 7
			Homework 7		
	Friday	27-May	No Class	Group Project Due	Quiz 7
13	**Monday**	30-May	Memorial Day (No Class)		
14	Tuesday	31-May	Exam 2 Chapters 5, 6, 7		
15	**Wednesday**	1-Jun	No Class		
16	Thursday	2-Jun	No Class		
	Friday	3-Jun	No Class	Chapter 10 reading	
				Chapter 10 videos	
17	Monday	6-Jun	Chapter 8 / Chapter 10		OA 8
					Quiz 8
18	**Tuesday**	7-Jun	Open Lab		
			Homework 8		
19	Wednesday	8-Jun	Chapter 10		OA 10
					Quiz 10
20	**Thursday**	9-Jun	Final Exam **Comprehensive**		
			Homework 10 - Budget Project		

REFERENCES

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