

Shared Syllabus for Problem Solving

Section and Instructor Information					Online Text	Table of Contents
1)	Jesús Jiménez RS 218 (849-2634)				<i>Excursions in Mathematics</i> 9 th Edition Peter Tannenbaum PEARSON ISBN: 978-0-13-446837-2	Required Material Course Content General Education Statement Course Philosophy Learning Outcomes Course Approach Grading Policy Distribution of student's work hours Attendance Policy Classroom Attire Academic Accommodations Academic Honesty Final Examination FERPA Policy References
2)	Jesús Jiménez RS 218 (849-2634)					
Section, Meeting Days, Time and Room						
1)	MW	7:30 – 9:00 am	LA	102		
	T (Lab)	7:30 – 8:30 am	LA	102		
2)	MW	4:30 – 6:00 pm	LA	102		
	T (Lab)	4:30 – 5:30 pm	LA	102		
Office Hours						
MW	9:30 – 11:30 am and 1:30 – 3:30 pm					
Office located in trailer #1 in gym parking lot.						

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

This is a general education course designed to give students experience with problem solving using a variety of techniques and examples of “real world” problems.

[Back to top](#)

Course Learning Outcomes

GE Learning Outcome: 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

[Back to top](#)

Required Material

Calculator: A scientific calculator is required. During examinations, you may not use your cell phone as a calculator.

[Back to top](#)

Course Description

A general education 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.

Prerequisite(s): [MTH 099](#) or equivalent and Junior or Senior standing.

[Back to top](#)

General Education Statement

This course is one of the components of the General Education Program at Point Loma Nazarene University, in support of the general education learning outcome: Quantitative Reasoning: Students will be able to solve problems that are quantitative in nature. The purpose of general education is to provide a common educational experience, to develop essential skills, and to provide a broad cultural background for personal and professional growth.

[Back to top](#)

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 requirements can be provided upon request. Note that if you have an online or hybrid class then you need to provide further details of the amount of time spent in various activities. We have samples in the department. Specific details about how the class meets the credit hour is provided below.

Online Quizzes	8.00
Online Homework	8.75
Reading Text	24.00
Watching Videos	8.00
In-Class Meeting	18.75
Written Homework	16.00
Group Project	6.00
Budget Project	4.00
Chapter Post Test Reviews	16.00
Midterms	2.50
Final Exam	2.50
TOTAL	114.50

[Back to top](#)

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].

[Back to top](#)

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.

[Back to top](#)

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.

Grading Distribution

Grade Distribution	
Two Tests at 20% each	40%
Final Exam	30%
Quizzes	5%
Written and/or Online Homework	12%
Group Project	5%
Individual Budget Assignment	5%
Class Participation	3%
Total	100%

[Back to top](#)

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]

[Back to top](#)

Grade components

The grade components are written homework, written tests, online homework, online quizzes, projects, class participation, and the final examination.

[Back to top](#)

Other factors that affect grades

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 and at least 70% of the course work is completed.

Questions on written assignments, tests, and exams: Written assignments and test/exam questions and problems must be formulated carefully in terms of words and symbols used in the course. Credit is determined by the degree to which answers and solutions respond to the specific question or problem stated. Maximize your credit by learning the language and symbols of the course.

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.

[Back to top](#)

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.

[Back to top](#)

NOTE: For Blended courses, attendance will be calculated as follows:

Face to face portion of the class:

You must be present on time for the full class for you to be considered present in the face to face meeting.

Online portion of the class:

You are expected to work on material online every week. In order to get credit for being "present" in the online portion of the class each week you must complete at least one online homework assignment or exam review assignment (for test weeks) before the due date/time for that week.

You will receive a warning if you miss 10% of the class (combination of face-to-face and online).

You will be automatically de-enrolled if you miss 20% of the class (combination of face-to-face and online).

[Back to top](#)

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.

[Back to top](#)

Academic Accommodations

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.

[Back to top](#)

Academic Honesty

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

http://catalog.pointloma.edu/content.php?catoid=24&navoid=1581#Academic_Honesty for definitions of kinds of academic dishonesty and for further policy information.

[Back to top](#)

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.

[Back to top](#)

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 5 weeks. Specific details about how the class meets the credit hour requirements can be provided upon request. Note that if you have an online or hybrid class then you need to provide further details of the amount of time spent in various activities. We have samples in the department.

[Back to top](#)

THE FINAL EXAM IS A COMPREHENSIVE EXAMINATION.

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.

[Back to top](#)

Daily Schedule

Daily Schedule				Summer 2018
	Date	In Class	Online Readings and Videos	Online HW and Quizzes
1	Monday	7-May	Chapter 1	Chapter 1 reading Intro to MyMathLab
			Chapter 1 videos	
2	Tuesday	8-May	Open Lab	Chapter 2 reading OA 1
			Chapter 2 videos	
3	Wednesday	9-May	Chapter 2	Quiz 1
			Homework 1	
4	Thursday	10-May	No Class	Chapter 4 reading OA 2
			Chapter 4 videos	
	Friday	11-May	No Class	Quiz 2 OA 4
5	Monday	14-May	Chapter 4	
			Homework 2	
6	Tuesday	15-May	Open Lab	Chapter 5 reading Chapter 5 videos
7	Wednesday	16-May	Chapter 5	Quiz 4
			Homework 4	
8	Thursday	17-May	Exam 1 Chapters 1, 2, 4	
	Friday	18-May	No Class	OA 5
9	Monday	21-May	Chapter 5	Chapter 6 reading Quiz 5
			Group Project	Chapter 6 videos
10	Tuesday	22-May	Chapter 6	Chapter 7 reading OA 6
			Homework 5	Chapter 7 videos
11	Wednesday	23-May	Chapter 7	Quiz 6
			Homework 6	
12	Thursday	24-May	No Class	OA 7
	Friday	25-May	No Class	Group Project Due Quiz 7
13	Monday	28-May	Memorial Day (No Class)	
14	Tuesday	29-May	Exam 2 Chapters 5, 6, 7	
			Homework 7	
15	Wednesday	30-May	Chapter 8	
16	Thursday	31-May	No Class	Chapter 8 reading Chapter 8 videos
	Friday	1-Jun	No Class	
17	Monday	4-Jun	Chapter 8 / Chapter 10	Chapter 10 reading OA 8
				Chapter 10 videos Quiz 8
18	Tuesday	5-Jun	Open Lab	
			Homework 8	
19	Wednesday	6-Jun	Chapter 10	OA 10 Quiz 10
20	Thursday	7-Jun	Final Exam Comprehensive	
			Homework 10 - Budget Project	

[Back to top](#)

Homework problems: These assignments are to be written up on paper and handed in at the beginning of class on (or before) the due date.

Chapter	Page	Problems	Due Date
1	28-35	# 16, 30, 38, 48, 54	5-9
2	59-66	# 20,32,54, 62, 64	5-14
4	128-135	# 22, 32, 40, 56, 64	5-16
5	164-172	# 26, 30, 46, 54, 64	5-22
6	195-204	# 36, 42, 52, 54, 60	5-23
7	221-226	# 30, 34, 36, 42, 50	5-29
8	250-258	# 46, 52, 56, 60, 62	6-5
10	317-320	# 46, 50, 54, 58, 62	6-7

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.

References

- Baron, J. B. and Sternberg, R. J. Teaching Thinking Skills: Theory and practice. (1987). New York: W. H. Freeman.
- Bransford, J. and Stein, B. (1984). The Ideal Problem Solver. New York: W. H. Freeman.
- Brown, Stephen I., and Marion I. Walter. (1983). The Art of Problem Posing. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Cheney, L. (Ed.) (19) 50 Hours (Cheney Report). HEW
- Curcio, F.R. (Ed.). (1987). Teaching and Learning: A problem solving focus. Reston, VA: NCTM.
- Duncker, K. (1945). On problem solving. Psychological Monographs 58, No. 5 Whole # 270.) Washington, DC: American Psychological Association.
- Dunham, William. (1990). Journey Through Genius: The great theorems of mathematics. New York: John Wiley & Sons.
- Eves, Howard. (1990). Foundations and Fundamental Concepts of Mathematics. 3rd ed. Boston: PWS-KENT.
- Eves, Howard. (1983). Great Moments in Mathematics. (2 vols.). The Mathematical Association of America.
- Gardner, Howard. (1985). The Mind's New Science. New York: Basic Books.
- Hofmann, J. E. (1957). The History of Mathematics. New York: Philosophical Library.
- Kilpatrick, Jeremy. (1987). "Problem Formulating: Where Do Good Problems Come From?" Cognitive Science and Mathematics Education, edited by Alan H. Schoenfeld, pp. 123-48. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Kline, M. (1962). Mathematics: A Cultural Approach. Reading, MA: Addison-Wesley.
- Kline, M. (1953). Mathematics in Western Culture. New York: Oxford University Press.
- Krulik, S. (Ed.). (1980). Problem Solving in School Mathematics. 1980 Yearbook of the National Council of Teachers of Mathematics. Reston, VA: NCTM.
- National Research Council. (1989). Everybody Counts: A Report to the Nation on the Future of Mathematics Education. Washington, DC: National Academy Press.
- Newell, A., and Simon, H. (1972). Human Problem Solving. Englewood Cliffs, J: Prentice-Hall.
- Papert, S. (1980). Mindstorms: Children, computers, and powerful ideas. New York: Basic Books.
- Paulos, John A. (1988). Innumeracy: Mathematical illiteracy and its consequences. New York: Hill and Wang.
- Peterson, Ivars. (1988). The Mathematical Tourist. New York: Freeman.
- Peterson, Ivars. (1990). Islands of Truth: A mathematical mystery cruise. New York: Freeman.
- Polya, G. (1945). How To Solve It. Princeton: Princeton University Press.
- Polya, G. (1954). Mathematics and Plausible Reasoning (2 vols.). Princeton: Princeton University Press.
- Polya, G. (1962 [Vol. 1] and 1965 [Vol. 2]; combined paperback edition, 1981). Mathematical Discovery. New York: Wiley.
- Polya, G., & Kilpatrick, J. (Eds.). (1974). The Stanford Mathematics Problem Book with Hints and Solutions. New York: Teachers College Press.
- Rolf, Howard L. (1988). Mathematics. Dubuque, IA: Wm. C. Brown.
- Schoenfeld, A. (1985). Mathematical Problem Solving. New York: Academic Press.
- Schoenfeld, A. (Ed.). (1987). Cognitive Science and Mathematics Education. Hillsdale, NJ: Lawrence Erlbaum.
- Steen, Lynn A. (Ed.) (1990). On the Shoulders of Giants: New Approaches to Numeracy. Washington, D.C.: National Academy Press.
- Tannenbaum, P. & Arnold, R. (1992). Excursions in Modern Mathematics. Englewood Cliffs, NJ: Prentice-Hall.
- Taylor A. (1995). Mathematics and Politics. Strategy, Voting, Power, and Proof. Springer-Verlag.
- Wickelgren, W. (1974). How to Solve Problems. San Francisco: W. H. Freeman.