Shared Syllabus for Problem Solving

Section and Instructor Information				
1)	Jesús Jiménez RS 218 (849-2634)			
2)	Jesús Jiménez RS 218 (849-2634)			
Section, Meeting Days, Time and Room				
1)	MTWR	7:30 – 9:00 am	LA	01
2)	MTWR	4:30 – 6:00 pm	LA	01
Office Hours				
MTW	9:30 – 11:30 am and 1:30 – 3:30 pm			

Online Text
Excursions in Mathematics
 8th Edition
Peter Tannenbaum
PEARSON
ISBN: 978-0-321-82573-5

Table of Contents

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.

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.

Required Materials
Calculator: A scientific calculator is required.

General Education Statement
This course is one of the components of the General Education Program at Point Loma Nazarene University, under the category of _Developing Cognitive Abilities_. By including this course in a common educational experience for undergraduates, the faculty supports the pursuit of personal awareness and skill development, focusing on the analytical, communicative, and quantitative skills necessary for successful living in society.

Course Philosophy
"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].

Learning Outcomes
GE Learning Outcome: Students will be able to solve problems that are quantitative in nature:
1. Students will be able to formulate a mathematical model from a verbal description of a problem.
2. Students will be able it solve non-routine problems using logic and quantitative techniques.
3. Students will be able to construct solutions to problems using computational techniques

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.

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 nonroutine 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.

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%**

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:

	A	B	C	D
Grading Scale in Percentages				
+		(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]

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

Distribution of student's work hours (for blended courses)

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**

Other factors that affect grades
- **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 need not be accepted. Work accepted late may be assessed a penalty. Make-up tests (or the exam) will be given only by arrangement with the instructor for reasons of documented emergency.
- **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.

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

NOTE: For Blended courses, here is how attendance will be calculated:

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).

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

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_HonestyA 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).

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.

FERPA Policy
In compliance with federal law, neither PLNU student ID nor social security number should be used in publicly posted grades or returned sets of assignments without student written permission. This class will meet the federal requirements by (Note: each faculty member should choose one strategy to use: distributing all grades and papers individually; requesting and filing written student permission; or assigning each student a unique class ID number not identifiable on the alphabetic roster.). Also in compliance with FERPA, you will be the only person given information about your progress in this class unless you have designated others to receive it in the "Information Release" section of the student portal. See Policy Statements in the (undergrad/ graduate as appropriate) academic catalog.

Classroom Attire
All students are expected to dress in ways that allow the classroom to be a place where all students are comfortable and can work efficiently. Certain distracting attire is not permitted in the classroom. For example, attire associated with the "rush" activities of fraternities and sororities simply causes too many distractions in the classroom. If you choose to "rush" one of the fraternities or sororities, please make sure the "rush" officials know that "rush" attire will not be allowed in this classroom.

THE FINAL EXAM IS A COMPREHENSIVE **EXAMINATION.** Successful completion of this class requires taking the final examination on its scheduled day. **No requests for early examinations or alternative days will be approved.**

The FINAL EXAM is on the last of classes in the same classroom.

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. (19950). Mathematics and Politics. Strategy, Voting, Power, and Proof. Springer-Verlag.
- Wickelgren, W. (1974). How to Solve Problems. San Francisco: W. H. Freeman.

MTH303 Daily Schedule	PLNU	Summer 2016
Date	**Details**	
Mon May 9, 2016	Chapter 1	due by 7:30am
	Chapter 1 reading and videos	due by 11:59pm
Tue May 10, 2016	Chapter 1 and 2	due by 7:30am
	Chapter 2 reading and videos	due by 11:59pm
	Introduction O.A. Become familiar with the exercise area and practice entering answers in MyLab and Mastering	due by 11:59pm
	OA 1	due by 11:59pm
Wed May 11, 2016	Chapter 2	due by 7:30am
	Homework Chapter 1	due by 7:30am
	Quiz 1	due by 11:59pm
Thu May 12, 2016	Chapter 4 reading and videos	due by 11:59pm
Mon May 16, 2016	Chapter 4	due by 7:30am
	Homework Chapter 2	due by 7:30am
	OA 2	due by 11:59pm
	Quiz 2	due by 11:59pm
Tue May 17, 2016	Chapter 4	due by 7:30am
	Chapter 5 reading and videos	due by 11:59pm
	OA 4	due by 11:59pm
Wed May 18, 2016	Chapter 5	due by 7:30am
	Homework Chapter 4	due by 7:30am
	Quiz 4	due by 11:59pm
Thu May 19, 2016	Exam 1: Chapters 1, 2, 4	due by 7:30am
Mon May 23, 2016	Memorial Day No Classes	due by 7:30am
Tue May 24, 2016	Chapter 5	due by 7:30am
Wed May 25, 2016	Chapter 6	due by 7:30am
	OA 5	due by 11:59pm
Thu May 26, 2016	Chapter 6	due by 7:30am
	Homework Chapter 5	due by 7:30am
	Chapter 6 reading and videos	due by 11:59pm
	Quiz 5	due by 11:59pm
Mon May 30, 2016	Chapter 7	due by 7:30am
	Homework Chapter 6	due by 7:30am
	Chapter 7 reading and videos	due by 11:59pm

MTH303 Daily Schedule	PLNU	Summer 2016
Date	**Details**	
	OA 6	due by 11:59pm
Tue May 31, 2016	Chapter 8	due by 7:30am
	Group Project	due by 11:59pm
	OA 7	due by 11:59pm
	Quiz 6	due by 11:59pm
Wed Jun 1, 2016	Chapter 8	due by 7:30am
	Quiz 7	due by 11:59pm
Thu Jun 2, 2016	Exam 2: Chapters 5, 6, 7	due by 7:30am
	Homework Chapter 7	due by 7:30am
	Chapter 8 reading and videos	due by 11:59pm
Mon Jun 6, 2016	Chapter 10	due by 7:30am
	Homework Chapter 8	due by 7:30am
	Chapter 10 reading and videos	due by 11:59pm
	OA 8	due by 11:59pm
	Quiz 8	due by 11:59pm
Tue Jun 7, 2016	Chapter 10	due by 7:30am
Wed Jun 8, 2016	Chapter 10	due by 7:30am
	OA 10	due by 11:59pm
	Quiz 10	due by 11:59pm
Thu Jun 9, 2016	Attendance/Participation	due by 7:30am
	Final Exam: COMPREHENSIVE	due by 7:30am
	Homework Chapter 10	due by 7:30am
	Budget Project	due by 11:59pm