

Math 242 Number Theory with Proofs

Spring 2017 -- (2 units)

T,Th 10:00-10:50 RS 14

Instructor: Ryan Botts, Ph.D.
Office Hours: M 8:30-9:30 & 1-4, WF 8:30-9:30
 TTh 9-10 & 1-2

Office: Rohr Science 228
Phone: 619.849.2968
Email: ryanbotts@pointloma.edu

Text: Elementary Number Theory by Gareth Jones and J. Mary Jones

Course Description

An introduction to proofs using the study of natural numbers, integers, prime factorization, divisibility, congruences, multiplicative functions, continued fractions, quadratic residues. Methods used include investigation, conjecture, inductive and deductive proofs. Offered on a Quad basis.

Learning Outcomes

- Students will be able to write proofs.
- Students will be able to demonstrate facility with algebraic structures.
- 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.

Thoughts on writing proofs

The best way to learn to write proofs is to practice writing them. There will be a great deal of time in class devoted to the appropriate structure for a mathematical proof. You will be most successful in this course if you participate in all of the in-class proof writing activities, if you stay current with your homework and if you re-write proofs that have been returned to you containing errors (either on homework or exams).

Grading:

Your grade for the course will be computed using the following weights:

Homework	26%
Projects and Activities (2-3)	12%
Proof of the week	12%
Midterm exam	20%
Final exam	30%
<hr/> Total	<hr/> 100%

At a minimum, letter grades will be assigned using the following grading scale:

	A	B	C	D
+		(87,90)	(77,80)	(67,70)
	[92,100]	[82,87]	[72,77]	[62,67]
-	[90,92)	[80,82)	[70,72)	[60,62)

Note that an overall score lower than a 60% will be assigned an F.

Homework:

Homework will be assigned each day at the end of class. All homework assigned in a week will be due at the start of class the next Friday. No late homework will be accepted except by prior arrangement or with a documented emergency. Homework assignments are posted in Canvas. The object of the homework is to learn how to do the problems so I expect to see calculations on your homework using the terminology and methods of the class and not just the answer. A random selection (the same for all people) of the problems will be graded on any homework assignment.

Projects and activities

During the semester you will be assigned 2-3 activities or projects that may require group work outside of class.

Proof of the week

There will be five of these proofs assigned throughout the semester. The due dates for the proofs are on the class schedule.

Exam

There is one in-class exam. If you do not take an exam you will receive a zero for it. Late exams may not be taken except by prior consent of the instructor or a documented emergency. I must participate in the decision for you to miss an exam, this means that you need to phone me before missing an exam.

Final

The final is cumulative and is given on **THURSDAY MAY 4, 10:30 AM-1:00 PM**. 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.

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 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.

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=18&navoid=1278#Class_Attendance

Because this course is a hybrid course, **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.

If you miss 10% of the class, you will receive a warning. If you miss 20% of the class, you will be automatically de-enrolled.

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. Students can also reach the Disability Resource Center by phone at 619-849-2486 or by e-mail at DRC@pointloma.edu. 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=18&navoid=1278#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=18&navoid=1278#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=18&navoid=1278#Academic_Honesty).

Final Exam: Date and Time:

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.

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 a 2 unit class delivered over 15 weeks. Specific details about how the class meets the credit hour requirements can be provided upon request.

E-mail and Messages:

I expect that you regularly use e-mail. I will periodically send you information and updates via e-mail and/or via canvas. In the first week of class you must activate your PLNU e-mail account if you are not currently using it.

	S	M	T	W	T	F	S
	8	9	10	11	12 Four Colors Theorem Move	13	14
	15	16 Martin Luther King Jr. Day	17 Four Colors Theorem Group Work Intro to Thms	18	19 Intro to Theorems	20	21
	22	23	24 Intro to Theorems Proof of the week 1	25	26 Intro to Theorems	27	28
	29	30	31 Intro to Theorems	1	2 Group proofs	3	4
February	5	6	7 Euclidean algorithm project	8	9 Euclidean algorithm discussion	10	11
	12	13	14 Euclidean algorithm discussion	15	16 Ch 1 Proof of the week 2	17	18
	19	20	21 Ch 1	22	23 Induction project	24	25
	26	27	28 Ch 2 Proof of the week 3	1	2 Exam	3	4
March	5	6 Spring	7 -----	8 Break	9 -----	10 Week	11
	12	13	14 Ch 2	15	16 Ch 2 Proof of the week 4	17	18
	19	20	21 Ch 2	22	23 Ch 3	24	25
	26	27	28 Ch 3	29	30 Ch 3	31	1
April	2	3	4 Ch 3 Proof of the week 5	5	6 Ch 4	7	8
	9	10	11 Ch 4	12	13 Easter Recess	14	15
	16	17 Easter Recess	18 Group project Lemma 5.1	19	20 Lemma 5.1	21	22
	23	24	25 Ch 5	26	27 Ch 11 Exam Review	28	29
	30	1	2	3	4 Final 10:30 AM - 1:00 PM	5	6

