# Syllabus

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| <br><br> | **Department: Mathematical, Information and Computer Sciences**<br><br>**Class: MTH3012 Number Theory with Proofs**<br><br>**Number of Units: 2**<br><br>**Class Time/Location: TR 8:30-9:25 Rohr Science 295** |
| Spring 2022 | |

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| **Instructor: Maria Zack, Ph.D.** |
| **Phone: 619.849.2458** |
| **Email: mzack@pointloma.edu** |
| **Office hours:**<br><br>On Zoom - **Click here for appointment** **(https://calendar.google.com/calendar/selfsched?sstoken=UUphMmZJc2tlVTFKfGRIZmF1bHR8YTE5OTI3YWQxZDFhZDc4MDExZWQ5ZjU3MDRhNmNkNTI)**<br><br>These are the times that I work to hold open for appointments. If none of them work you can email me to see if we can find another time.<br><br>Monday 8:00 - 9:30 AM & 2:30 - 3:30 PM<br><br>Tuesday 10:30 AM - 12:00 PM<br><br>Wednesday 7:00 - 8:00 AM<br><br>Thursday 3:00 - 4:00 PM<br><br>Friday 11:00 AM - 12:00 PM |

## 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 is an expression of faith. Being of Wesleyan heritage, we strive 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

MTH 3012 - Number Theory with Proofs (2)

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.

Prerequisite(s): MTH 1074 with a grade of C- or higher.

## COURSE LEARNING OUTCOMES

1. Students will be able to write proofs.
2. Students will be able to demonstrate facility with algebraic structures.
3. Students will be able to speak about their work with precision, clarity and organization.
4. Students will be able to write about their work with precision, clarity and organization.
5. Students will collaborate effectively in teams.
6. Students will be able to identify, locate, evaluate, and effectively and responsibly use and cite information for the task at hand.
7. Students will be able to gather relevant information, examine information and form a conclusion based on that information.

## REQUIRED TEXTS AND RECOMMENDED STUDY RESOURCES

*Elementary Number Theory* by Gareth Jones and J. Mary Jones

## COURSE CREDIT HOUR 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 2 unit class delivered over fifteen weeks. Specific

details about how the class meets the credit hour requirement can be provided upon request. (Based on 37.5 hours of student engagement per credit hour.)

## ZOOM SESSION EXPECTATIONS

- Treat this like any other class, and show up to the Zoom session on time.
- Turn on camera and make sure your camera is turned on for the entire length of the class.
  - If you need to have camera turned off an email MUST be sent to me prior to class otherwise I will consider this an unexcused absence.
  - Excused reasons for intermittent camera being off: need to use the restroom, needing to protect roommate.
- Participate with the class by unmuting OR using the chat.
- Make sure you are in a quiet space (when possible) free of distractions.
  - Students will not be considered present in class if they are driving a car, at work etc.
  - You should reserve this class time just like you would if you were face to face.
- Once PLNU returns to face-to-face learning, unless you have an EAC accommodation (i.e., Isolation/Quarantine, Concussion, Remote Accommodation), you may not participate via remote learning.
- Please keep in mind that PLNU's absence policy states that you may not surpass 20% of our class sessions.

## ASSESSMENT AND GRADING

### Graded Components

- **Homework**: Homework will be assigned daily and will be due at the start of class the Thursday of the following week. But do your homework every day or you will end up struggling.
- **Projects:** There will be projects assigned some weeks and they will replace class meetings so that if it is a group project, you will have the class time to work on them.
- **Proof of the Week**: There will be 4-5 of these proofs assigned throughout the semester. They are an opportunity for you to show your progress in proof writing and they will be graded very carefully.
- **Examinations and the Final Examination**. Examinations and the Final Examination 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 final exam date and time 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.

- **Late work will not be accepted** without prior consent or a well-documented emergency.  Up to a maximum of one homework assignment will be accepted up to 3 days late provided that consent is received from the professor before it is due.  Homework assignments that are submitted late without prior consent will be recorded with a score of zero.  If more than half of the homework assignments are submitted on time, then the lowest homework score will be dropped from the calculations of the homework grade.
- 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.

| Grading Distribution | Percent |
|---|---|
| Homework | 25 |
| Projects | 12 |
| Exam | 20 |
| Proof of the Week | 13 |
| Final Exam | 25 |
| Total | 100 |

**Grading Scale**

Grades are based on the number of points accumulated throughout the course with the following exception.  A student must pass at least one of the Exam or the Final Exam in order to pass the class.  That is, a score of 60% must be achieved on one of the Exams, or else the final grade will be an F regardless of all other point totals.  Approximate minimal percentages required to obtain a given grade are:

| Standard Grade Scale Based on Percentages | | | | |
|---|---|---|---|---|
| | A | B | C | D | F |
| + | | 87.5- 90 | 77.5-80 | 67.5-70 | |

| Standard Grade Scale Based on Percentages | | | | | |
|---|---|---|---|---|---|
| | A | B | C | D | F |
| | 92.5 -100 | 82.5-87.5 | 72.5-77.5 | 62.5 -67.5 | 0-60 |
| _ | 90-92.5 | 80-82.5 | 70-72.5 | 60-62.5 | |

## 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 (https://www.pointloma.edu/offices/office-institutional-effectiveness-research/disclosures)** to view which states allow online (distance education) outside of California.

## INCOMPLETES AND LATE ASSIGNMENTS

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.

## 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.

## PLNU COPYRIGHT POLICY

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.

## 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 **ADC Academic and General Policies (https://catalog.pointloma.edu/content.php?catoid=48&navoid=2757#Academic_Honesty)** for definitions of kinds of academic dishonesty and for further policy information.

During the first week of class, you will be asked to submit an Academic Honesty Verification Statement. Submitting the statement is a requirement of this course.  By submitting the Academic Honesty Verification Statement, you will be verifying all assignments completed in this course were completed by you.  Carefully review the Academic Honesty Statement below.

Statement: "In submitting this form, I am verifying all the assignments in this course will be completed by me and will be my own work."

## 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 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** **(https://www.pointloma.edu/offices/spiritual-development)**
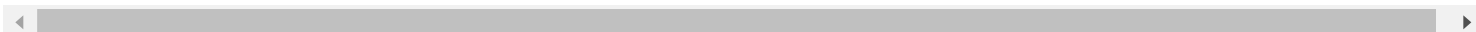
## PLNU ATTENDANCE AND PARTICIPATION POLICY

Regular and punctual attendance at all **synchronous** class sessions is considered essential to optimum academic achievement. If the student is absent for more than 10 percent of class sessions (virtual or face-to-face), the faculty member will issue a written warning of 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. In some courses, a portion of the credit hour content will be delivered **asynchronously** and attendance will be determined by submitting the assignments by the posted due dates. See **Academic Policies (https://catalog.pointloma.edu/content.php?catoid=46&navoid=2650#Class_Attendance)** in the Undergraduate Academic Catalog.  If absences exceed these limits but are due to university excused health issues, an exception will be granted.

## PLNU USE OF TECHNOLOGY

In order to be successful in the online environment, students need to meet the minimum technology and system requirements; please refer to the **Technology and System Requirements (https://help.pointloma.edu/TDClient/1808/Portal/KB/ArticleDet?ID=108349)** information. If a student is in need of technological resources please contact **student-tech-request@pointloma.edu (mailto:student-tech-request@pointloma.edu)**

*Problems with technology do not relieve students of the responsibility of participating, turning in assignments, or completing class work.*

| Monday | Tuesday | Wednesday | Thursday | Friday |
|---|---|---|---|---|
| 10-Jan<br>**BUSINESS DAY** | 11-Jan | 12-Jan | 13-Jan<br>Intro Theorems<br>Online Syllabus Quiz | 14-Jan |
| 17-Jan<br>**MLK DAY** | 18-Jan<br>Intro Theorems | 19-Jan | 20-Jan<br>Intro Theorems<br>Proof of the Week #1 | 21-Jan |
| 24-Jan | 25-Jan<br>Intro Theorems | 26-Jan | 27-Jan<br>**PROJECT: Group Proofs**<br>No lecture | 28-Jan |
| 31-Jan | 1-Feb<br>Intro Theorems | 2-Feb | 3-Feb<br>Intro Theorems | 4-Feb |
| 7-Feb | 8-Feb<br>Euclidean Algorithm | 9-Feb | 10-Feb<br>Jones Chapter 1 | 11-Feb |
| 14-Feb | 15-Feb<br>Jones Chapter 1 | 16-Feb | 17-Feb<br>Jones Chapter 1<br>Proof of the Week #2 | 18-Feb |
| 21-Feb | 22-Feb<br>Jones Chapter 1 | 23-Feb | 24-Feb<br>Jones Chapter 1<br>Exam Review | 25-Feb |
| 28-Feb | 1-Mar<br>**EXAM** | 2-Mar | 3-Mar<br>**PROJECT: Induction**<br>No lecture | 4-Mar |
| 7-Mar<br>**SPRING BREAK** | 8-Mar<br>**SPRING BREAK** | 9-Mar<br>**SPRING BREAK** | 8-Mar<br>**SPRING BREAK** | 9-Mar<br>**SPRING BREAK** |
| 14-Mar | 15-Mar<br>Jones Chapter 2<br>Proof of the Week #3 | 16-Mar | 17-Mar<br>Jones Chapter 2 | 18-Mar |
| 21-Mar | 22-Mar<br>Jones Chapter 2 | 23-Mar | 24-Mar<br>**PROJECT: Chinese Remainer Thm**<br>No lecture | 25-Mar |
| 28-Mar | 29-Mar<br>CRT Discussion | 30-Mar | 31-Mar<br>Jones Chapter 3 | 1-Apr |
| 4-Apr | 5-Apr<br>Jones Chapter 3<br>Proof of the Week #4 | 6-Apr | 7-Apr<br>Jones Chapter 3 | 8-Apr |
| 11-Apr | 12-Apr<br>Jones Chapter 3 | 13-Apr | 14-Apr<br>**EASTER BREAK** | 15-Apr<br>**EASTER BREAK** |
| 18-Apr<br>**EASTER BREAK** | 19-Apr<br>Jones Chapter 4 | 20-Apr | 21-Apr<br>Jones Chapter 4 | 22-Apr |
| 25-Apr | 26-Apr<br>**PROJECT: Proofs** | 27-Apr | 28-Apr<br>Jones Chapter 5 | 29-Apr |
| 2-May | 3-May<br>**FINAL 7:30-10:00 AM** | 4-May | 5-May | 6-May |