

Meeting days & times: Thursday 8:00 - 11:00 am Thursday 1:30 - 4:30 pm	Instructor: Prof. Jorji Siegmundt *Contact info & photos for instructor and TAs can be found on Canvas	Meeting location: Sator Hall 221
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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 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.

Foundational Explorations Mission

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 culture.

COURSE DESCRIPTION

An inquiry-based laboratory that is a co-requisite for CHE1003.

COURSE LEARNING OUTCOMES

An understanding of chemistry is a necessary part of an education in the basic and applied sciences, engineering, and medical professions. It also provides insight and increased comprehension regarding current events and proposed policies.

By the end of the course, you will be able to:

- Explain the importance of chemistry in the life of bacteria.
- Design an experiment to test the effect of culture conditions on antibiotic production in bacteria.
- Select appropriate techniques to separate and identify molecules from a complex sample.
- Analyze genomic and metabolomic data to identify what kinds of antibiotics a bacterium has the 'blueprints' to produce, versus which antibiotics it actually produces.
- Analyze and communicate your findings back into the global Tiny Earth Network.

REQUIRED RESOURCES

For lab, you'll need to purchase a pair of protective **lab glasses** and a **lab coat**. You may either bring your own or purchase them from the chemistry club on the first day of lab for \$10 (\$5 for the lab coat, and \$5 for the lab glasses). You are encouraged to store these in a designated location in the lab.

Since this is a newer course format, your 'text' will be excerpts from the not-yet-published lab manual, included here in the Canvas course. (*Note that your input on the readings is very welcome and may shape the final manuscript!*)

SAFETY

Safety is the top priority in the lab. You will be required to sign a safety agreement contract before you can take part in the lab. The agreement contract delineates safety rules set forth by the department. If you fail to comply with any one of the rules in the safety agreement, you may be excluded from the lab and will not have the opportunity to make up missed assignments. You must wear a mask or face-covering at all times during the lab period. Your compliance with lab safety will count towards your participation grade.

ATTENDANCE POLICIES

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 (one lab period), the faculty member may file a written report which may result in de-enrollment. If the absences exceed 20 percent (three lab periods), 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 [Academic Policies](#) in the Undergraduate Academic Catalog.

Laboratory sections will meet on a weekly basis beginning Thursday, January 20, 2022. There are no allowed or excused absences except as approved in writing by the Provost for specific students participating in certain university-sanctioned activities, such as sports, debate, music, etc., or due to medically-verified illness. You must obtain permission from the Provost or Wellness Center. If you must miss a lab for a valid reason (Provost-*approved* activity or Wellness Center-*verified* illness, etc.), then you must make *prior* arrangements by sending an email to the Prof. Siegmundt, no later than the week *before* the lab that you will miss. If you do not provide *prior* notice, will receive grades of zero for each missed assignment. If you cannot provide *prior* notice, then ask someone else to send the email for you *before* the class you will miss. No other shifts in lab schedules will be permitted. **You are responsible for all the material covered in lab even if you did not attend.**

EXAMPLE LAB SCHEDULE

In this lab, we will be doing real scientific research, which is to say that *we don't know the outcome ahead of time!* As a result, the precise activities week-to-week WILL vary depending on the outcome of a previous experiment. After week 1, treat the schedule below as an *example* of one possible sequence of activities. Yours can - and likely will - look quite different!

Pre-lab Assignments will be due on the day before your lab by midnight (11:59:59pm on Wednesday). Post-lab Assignments will be due on the Sunday after your lab by midnight. Initial discussion posts will be due on respective Sundays, and the responses will be due at the beginning of your next lab period.

Occasionally, lab may be held **in one of the computer labs in Ryan Library** or **asynchronously** (in which case you can complete the lab at a time of your choice during the week). Your instructor will let you know the preceding week if this is the case.

Week	Readings & Assignments	Lab Agenda
1 (1/18-1/23)	Section 1: Intro to CHE 1003L Lab Syllabus & Schedule Pre-lab Assignment: Syllabus Quiz due Jan 16th Protocol: Scientific measurements & general lab techniques Week 1 Post-lab assignment	Introductions Lab Safety Intro to Lab Equipment Scavenger Hunt Measurements Lab
2 (1/24-1/30)	Section 2: Bacteria & Antibiotics Protocols: Techniques for working with Bacteria Week 2 Pre-lab Assignment Week 2 Post-lab Assignment	Central Dogma What are antibiotics? Bacteria culturing
3 (1/31-2/6)	Section 3: Natural Products Meet Tiny Earth Strain TE3760 Protocols: Liquid-liquid extraction Week 3 Pre-lab Assignment Week 3 Post-lab Assignment	What are natural products? Liquid-liquid extraction Determining density
4 (2/7-2/13)	Section 4: Turning on antibiotic production lines Protocol: AntiSMASH Week 4 Pre-lab Assignment Week 4 Post-lab Assignment	Discussion: Culture conditions Write media recipe/instructions for your TA to prepare your chosen media
5 (2/14-2/20)	Section 5: Growing bacteria to study Protocols: Growing in liquid culture, growing in solid culture Week 5 Pre-lab Assignment Week 5 Post-lab Assignment	Inoculation
6 (2/21-2/27)	Section 6: How natural products are made Protocol: AntiSMASH of TE3760 Week 6 Pre-lab Assignment Week 6 Post-lab Assignment	AntiSMASH analysis of TE3760 <i>(Bring your computer)</i>
7 (2/28-3/6)	Section 7: Extraction	TE3760 Extraction Disk diffusion bioassay

	Protocol: Liquid-liquid extraction, disk-diffusion bioassay Week 7 Pre-lab Assignment Week 7 Post-lab Assignment	
3/7-3/11	<i>Spring Break - no classes</i>	
8 (3/14-3/20)	Section 8: Chemical separations Protocols: TLC, TLC bioautography Week 8 Pre-lab Assignment Week 8 Post-lab Assignment	Disk diffusion results TLC of TE3760 TLC bioautography
9 (3/21-3/27)	Section 9: Mass Spectrometry Protocol: Exploring LCMS data Week 9 Pre-lab Assignment Week 9 Post-lab Assignment	Examine LCMS data of antibiotics, TE3760 TLC Bioautography of active extracts <i>(In the computer lab)</i>
10 (3/28-4/4)	Section 10: NMR spectroscopy Protocols: NMR sample prep and data acquisition, NMR data analysis Week 10 Pre-lab Assignment Week 10 Post-lab Assignment	Acquire ¹ H NMR and HSQC spectra on crude extracts Identify compound classes using NMR
11 (4/7-4/13)	Poster Workshop	Prepare group posters
4/14-4/18	<i>Easter Recess - no classes</i>	
12 (4/21-4/27)	Final Project	Final poster presentation

ASSESSMENT AND GRADING

The activities described above will contribute to your total course grade according to the following distribution:

Pre-lab assignments & Quizzes	30%	Participation	10%
Post-lab assignments	45%	Final Poster Presentation	15%

The participation component will evaluate your preparedness for each experiment as you arrive in lab; your participation in each part of the experiment, whether working individually or with a partner; your attention to lab safety and neatness during lab; and cleanup of your lab space and public lab spaces, as

needed, including equipment and chemicals, before you leave the lab for the day. One component of this grade will be an evaluation of your participation by your lab partner or group.

There is no final exam for CHE 1003L.

Student grades will be posted in the Canvas grade book throughout the course. Letter grades will be assigned at the end of the course based on your percentage of total possible points, according to the following scale:

Standard Grade Scale Based on Percentages				
A	B	C	D	F
A 93-100	B+ 87-89	C+ 77-79	D+ 67-69	F Less than 59
A- 90-92	B 83-86	C 73-76	D 63-66	
	B- 80-82	C- 70-72	D- 60-62	

INCOMPLETE AND LATE ASSIGNMENTS

All assignments are to be submitted/turned in according to the due dates posted on Canvas.

Pre-lab assignments: Pre-lab assignments need to be completed prior to coming into the lab in order to be prepared for class. If turned in between 12:01am on the day of lab (Thursday) and the time your lab section begins (8:00am for Section 1; 1:30pm for Section 2) will receive a 10% deduction in score. Once your lab section time begins, any late pre-lab assignments will receive a 50% deduction in score.

Post-lab assignments: Late post-lab assignments will receive a 10% reduction in score if they are submitted within one week after the due date. After this time, post-lab assignments will receive a 50% reduction in score.

Incomplete assignments: If there are any incomplete assignments remaining at *beginning* of the poster workshop in Week 11, those assignments will each receive grades of zero.

As a reminder, if you do not provide notice prior to an absence, you will receive grades of zero for each missed assignment.

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 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 [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.

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](#)

USE OF TECHNOLOGY

In order to be successful in the online environment, you'll need to meet the minimum technology and system requirements; please refer to the *Technology and System Requirements* information. Additionally, students are required to have headphone speakers compatible with their computer available to use. If a student is in need of technological resources, please contact student-tech-request@pointloma.edu.

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