



Biology Department

BIO 3052-2 Research Methodology

3 Units

Fall 2023

Meeting days/times (Thursdays, 8:00-11:00AM)

Meeting location (Ryan Library 213)

Final Exam: (12/14/23, 7:30-10:00AM)

Instructor title and name:	Dr. Kris Koudelka; Professor of Biology
Phone:	(619)-849-2979
Email:	kriskoudelka@pointloma.edu
Office location and hours:	<p><u>Office:</u> Rohr Science 122 <u>Scheduled office hours:</u> M,W 1-2PM, Thurs 11AM-12PM</p> <p><i>Email me to set up an appointment. I love meeting with students and am happy to find a time that works for both of us, especially if the scheduled office hours do not work for you. Emailing me to set up an appointment will also ensure that I am not in another meeting at the time.</i></p>

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.

Course Description✳️

This course builds upon the basis of the scientific method that students are exposed to as freshmen. It focuses on teaching students how to develop biological questions, search databases to obtain background information, design scientific experiments, and analyze data. The course will focus more specifically on how research data is obtained (A below), how experimental knowledge and data are dispersed amongst the scientific community (A and B), and how these data are used as a base for correlating new data and upon which new experimentation is based (A and B). Prerequisite(s): Genetics.

A. Research design:

- Practice methods by which novel questions worthy of addressing are identified.
- Determine how scientific inquiry is used to address these questions from a research standpoint along with how to predict outcomes of experiments.
- Identify and use appropriate statistical analyses to analyze data, arrive at valid conclusions, and appropriately design follow-up or repeat experimentation.

B. Bioinformatics:

- Introduce the various databases available to researchers.
- Introduce the idea of implementing bioinformatics into question identification and experimental design.
- Introduce the idea of implementing bioinformatics for the analysis of real data and correlation of conclusions into previous scientific knowledge.

Program and Course Learning Outcomes✳️

Students will be able to:

- 1) Analyze primary literature and based on the data and conclusions presented, determine appropriate questions for subsequent experimentation.
- 2) Critically analyze data and judge conclusions using appropriate statistics and scientific logic.

- 3) Explain how bioinformatics and wet-lab are integrated in modern scientific research.
- 4) Query various bioinformatics databases available online and interpret the information obtained from these databases.
- 5) Create, write, and defend a biologically-related research proposal based on existing primary literature found through PubMed or other related scientific publication databases and feasible, existing scientific experimental techniques.

Required Texts and Recommended Study Resources*

The required course material for BIO3052 is now available for purchase. It is published and distributed by Cognella, Inc.

When you purchase directly from Cognella, you'll receive the lowest price, as well as immediate access to your materials so you can start reading and studying right away. Purchasing directly from the publisher is also a safe and effective way for you to receive everything you need for the term.

Purchase your course material, *BIO3052 - Research Methodology*, at the [Cognella Store](#) [Links to an external site.](#)

This course material includes information that we will reference and use in class regularly, so you should be sure to purchase your own copy. Please keep in mind that our institution is strict about copyright law and course material should never be copied or duplicated in any manner.

If you need any help with ordering from Cognella, feel free to email orders@cognella.com or call 858-552-1120 x503.

Assessment and Grading⊕

(Approximate; we reserve the right to adjust percentages as appropriate for how the course proceeds)

In-class assignments	17%	(85 points total)
Research grant proposal (final)	30%	(150 points total)
Grant review and study section	8%	(40 points total)
Class participation and attitude	5%	(25 points total)
<u>Tests (1 midterm and final exam)</u>	<u>40%</u>	<u>(200 points total)</u>
Total	100%	

Research Grant Proposal:

For this project, you will be working in pairs. The main assignment will be for you to write a relatively short (6-8 page), basic grant proposal. This can be on any biologically relevant topic that you are interested in. We do not expect this to be at the level of submission and funding, but this is a substantial portion of your grade and should be treated as such. Your proposal should demonstrate the ability to 1) research a topic, 2) integrate, analyze, and understand several recent primary literature articles on the topic, 3) generate a reasonable research for your focus, and 4) design a few experimental suggestions to address the research focus. This will be a difficult assignment, but it is a very important exercise. All of science rests on one's ability to integrate previous knowledge and expand on that knowledge in order to continue to propagate our scientific understanding. Beyond that, the ability to adequately describe your ideas for funding is key to any job, particularly in the sciences, whether you are interested in pursuing a career in research, medicine, teaching, or any other science-related field. The best ideas in the world will never come to fruition if they aren't funded. The hardest part of the assignment will be to assemble the information and get your ideas together, so we strongly suggest once again that you don't procrastinate on this assignment. To help make sure you don't procrastinate, you will notice a few interim deadlines throughout the schedule.

This project will thus incorporate most of the principles taught in this course while allowing everyone to practice these principles on a topic of your choice / interest. We will work on the main principles of this extensively together throughout the semester, but you are expected to do most of your work on this project outside of class. I STRONGLY suggest not waiting until the end to do this. You will not be happy with yourself or your grade if you procrastinate. If you work reasonably, but diligently throughout, my hope is that you will find this to be an interesting and rewarding. Please see us, or any of your other professors, for help throughout. We plan to help you get started (if needed) and then hope that you will work on your own and come to us often with specific questions for direction. Further details and expectations will be given separately.

Late Policy

0-24 hours late = can achieve up to 75% of possible points; 24-48 hours late = can achieve up to 50% of possible points; and more than 48 hours late = will not be accepted.

Approximate grade breakdown

A	93.33-100%	B	83.34-86.66%	C	73.34-76.66%	D	63.34-66.66%
A-	90-93.33%	B-	80-83.33%	C-	70-73.33%	D-	60-63.33%
B+	86.67-89.99%	C+	76.67-79.99%	D+	66.67-69.99%	F	0-59.99%

Final Examination Policy⊕

Successful completion of this class requires taking the final examination on its scheduled day. The final examination schedule is posted on the [Class Schedules](#) site. If you find yourself scheduled for three (3) or more final examinations on the same day, you are authorized to contact each professor to arrange a different time for one of those exams. However, unless you have three (3) or more exams on the same day, no requests for alternative final examinations will be granted.

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 your professor or the [Office of Spiritual Life and Formation](#).

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.

Artificial Intelligence (AI) Policy*

You are allowed to use Artificial Intelligence (AI) tools (e.g, ChatGPT, iA Writer, Marmot, Botowski) to generate ideas, but you are not allowed to use AI tools to generate content (text, video, audio, images) that will end up in any work submitted to be graded for this course. If you have any doubts about using AI, please gain permission from the instructor.

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.

Language and Belonging*

Point Loma Nazarene University faculty are committed to helping create a safe and hospitable learning environment for all students. As Christian scholars we are keenly aware of the power of language and believe in treating others with dignity. As such, it is important that our language be equitable, inclusive, and prejudice free. Inclusive/Bias-free language is the standard outlined by all major academic style guides, including MLA, APA, and Chicago, and it is the expected norm in university-level work. Good writing and speaking do not use unsubstantiated or irrelevant generalizations about personal qualities such as age, disability, economic class, ethnicity, marital status, parentage, political or religious beliefs, race, gender, sex, or sexual orientation. Inclusive language also avoids using stereotypes or terminology that demeans persons or groups based on age, disability, class, ethnicity, gender, race, language, or national origin. Respectful use of language is particularly important when referring to those outside of the religious and lifestyle commitments of those in the PLNU community. By working toward precision

and clarity of language, we mark ourselves as serious and respectful scholars, and we model the Christ-like quality of hospitality.

You may report an incident(s) using the [Bias Incident Reporting Form](#).

Sexual Misconduct and Discrimination*

In support of a safe learning environment, if you (or someone you know) have experienced any form of sexual discrimination or misconduct, including sexual assault, dating or domestic violence, or stalking, know that accommodations and resources are available through the Title IX Office at pointloma.edu/Title-IX. Please be aware that under Title IX of the Education Amendments of 1972, faculty and staff are required to disclose information about such misconduct to the Title IX Office.

If you wish to speak to a confidential employee who does not have this reporting responsibility, you can contact Counseling Services at counselingservices@pointloma.edu or find a list of campus pastors at pointloma.edu/title-ix.

PLNU Attendance and Participation Policy⊕

Regular and punctual attendance at all class sessions is considered essential to optimum academic achievement. If the student is absent for more than 10 percent of class sessions, 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 withdrawal date or, after that date, receive an “F” grade.