



Department of Physics and Engineering

**EGR 4082-1 / PHY 4082-1 – Senior Project II**

2 Units

*Spring 2026*

**Meeting days/times: Wednesdays, 6:00-7:50 PM**

**Meeting location: Rohr Science 365**

**Final Exam: Wednesday, May 6, from 4:30-6:30 PM, in RS 365<sup>1</sup>**

**Instructor Title and Name:** Professor Jon Viducich, P.E.

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**Office Location and Office Hours:** Via Zoom, by appt. (Please email the instructor to schedule.)

**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.

**Department Mission**

The Department of Physics & Engineering provides strong programs of study that aid in ensuring our students are well prepared for both graduate studies and careers in a variety of scientific and engineering fields. We emphasize a collaborative learning environment that allows students to thrive academically, build personal confidence, and develop interpersonal skills, while providing a Christian setting for students to learn values and judgment and pursue integration of modern scientific knowledge and Christian faith.

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<sup>1</sup> Please note that the final exam will not take place during the university-scheduled final exam date/time for this course, due to the need to facilitate program requirements for faculty and community member attendance.

## **Course Description**

This course provides students (teams with) the opportunity to hone and finish building the project design initiated in EGR 4072. The students will prepare a scientific paper about their project and give an oral presentation of their findings. This course will normally be completed in a student's senior year.

## **Program and Course Learning Outcomes**

The Program Learning Outcomes (PLOs) assessed in this course are:

- An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics (CC: CT)
- An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
- An ability to communicate effectively with a range of audiences (CC: OC, WC, IL)
- An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
- An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
- An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions (CC: QR)
- An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

## **Required Texts and Recommended Study Resources**

No textbooks are required for this course.

## **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 15 weeks. It is anticipated that students will spend a minimum of 37.5 participation hours per credit hour on their coursework. For this course, students will spend an estimated minimum 75 total hours meeting the course learning outcomes.

## **Assessment and Grading**

This course seeks to prepare students for their engineering careers through self-directed, project-based learning, with an emphasis on professionalism. By completing an engineering design project with limited faculty oversight, students will continue to develop the skills they will need to be successful in a professional setting. As such, assigned grades will reflect the approximate quality, completeness, and timeliness of deliverables expected of an entry-level, junior engineer. Graded project deliverables include the following (100 total points possible):

- Project Proposal (10 points):** At the start of the term, each team will prepare a proposal for the Spring Semester scope of work. In addition to documenting any remaining work required to complete the detailed prototype, the proposal must explain how data will be collected and analyzed to inform design optimization (i.e., detailed testing protocols and specific analyses planned) and include plans for documenting and presenting the final design. The proposal must include a schedule with at least three major milestones and weekly tasks assigned to each team member, designed to reach each milestone on time. The draft proposal will be peer-reviewed during class time and feedback from peers, the instructor, the faculty mentor, and the client must be incorporated in the final version. By formally defining the testing plan and other tasks, this document will help students set appropriate goals and ensure the timely delivery of prototype designs to the client. Grading for the assignment will be based on the completeness, quality, and on-time submittal of both the draft and final versions.
- Progress Report (5 points):** Each project team will prepare a written, formal progress report, due on Week 8 of the term. The progress report will give students an opportunity to formally evaluate and present their progress to the client, practice their technical writing skills, and continue to become familiar with a tool frequently used in industry. Detailed feedback was provided on the progress reports submitted during the Fall Semester; these comments should be incorporated to reflect learning and improvement. Grading for the assignment will be based on the completeness, quality, and on-time submittal of the reports.
- Technical Manual (15 points):** Each project team will develop a manual documenting the design, construction, and use of their work product. This documentation will allow the client to construct, operate, and continue optimizing the designs in the future. Grading for the assignment will be based on the completeness, quality, and on-time submittal of both the draft and final versions.
- Final Report (15 points):** Each project team will prepare a publication-quality report, due on the last day of the regular term, describing the work completed during the term. The draft-final report sections will be peer-reviewed during class time and feedback must be incorporated in the final version. Detailed feedback was provided on the Final Reports submitted during the Fall Semester; these comments should be incorporated to reflect learning and improvement. Grading for the assignment will be based on the completeness, quality, and on-time submittal of both the draft and final versions and the comment responses.
- Final Presentation (10 points):** The entire class will present the work completed over the course of the year during the final exam session. Each project team will be responsible for presenting their work as part of the combined, single presentation. Students will have an opportunity to practice the final presentation in class during the last week of the regular term and receive feedback, though only the final presentation will be graded. The presentations will be open to PLNU students, faculty, and professional community members to attend. Grading for the assignment will be based on formal evaluation of both the presentation visuals (e.g., slides) and oral delivery, including appropriate responses to audience questions.
- Weekly Performance Evaluations (30 points; 3 points each):** For 10 weeks following completion of the proposal (Weeks 5-8 and 10-15; 10 weeks total), each team's performance will be evaluated based on their work on that week's planned tasks, as defined in their proposal. This will support each team in completing the project by the end of the term. Student performance

will be evaluated by the faculty mentor during a weekly meeting with each team. Grading will be based on the completeness, quality, and on-time completion of assigned tasks.

- **Course Participation (15 points):** At the end of the term, each student will receive a single course participation grade reflecting their individual contributions to both the group learning environment and written group deliverables submitted throughout the term. Grades will be determined based on peer evaluations, a faculty mentor evaluation, a professor evaluation, and an individual technical writing evaluation.

Except where indicated, project deliverables will be submitted and graded on a group basis, meaning that students will receive the same score for group assignments. This is intended to reflect the realities of both industry and academia. However, each student is expected to substantially contribute to all deliverables; please note that students cannot pass the course based on group deliverables alone.

Students are expected to arrive on time and prepared for class sessions and planned team meetings outside of class. Most weeks, class sessions will include a brief, informal oral progress report by each project team to describe progress made and to solicit feedback from the instructor and peers. Some weeks, class time will be dedicated to peer review of draft documents (e.g., proposals, report sections, etc.). Students are expected to support each other in the learning process by asking thoughtful questions and providing constructive and respectful written and oral feedback during class sessions. Outside of class, teams are expected to meet weekly with the Faculty Mentor, Dr. José Manjarrés, who is available as a resource to provide project management and technical support. Teams are expected to develop and commit to a team contract outlining expectations for all members, then honor those commitments throughout the semester. Please note that all activities contributing to the Course Participation grade are designed to directly benefit students by supporting them in the on-time delivery of excellent projects.

Final grades will be assigned based on the number of points accumulated throughout the course as a percentage of the total points possible. The percentage ranges 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	
	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	

## **Final Examination Policy**

Successful completion of this class requires taking the final examination on its scheduled day (see Footnote 1). 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. Given the need to facilitate faculty and community member attendance for program requirements, any students with concerns about the scheduled final examination time must contact the instructor during the first week of the term. Unless you have three (3) or more exams on the same day, no requests for alternative final examinations will be granted.

## **Incompletes and Late Assignments**

All assignments are to be submitted by the due dates. Assignments will be considered late if submitted after the indicated due date and time. Late assignments will receive a grade of 0, except in extremely unusual circumstances and at the instructor's discretion. Note: If, due to extreme circumstances, students foresee that they will not be able to submit an assignment on time, they must inform the instructor and discuss options as early as possible. Extensions will not be considered when failure to meet a deadline is coupled with poor communication.

## **Artificial Intelligence (AI) Policy**

You are allowed to use Artificial Intelligence (AI) tools (e.g., ChatGPT, Gemini Pro 1.5, GrammarlyGo, Perplexity, etc) 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 in accordance with the Americans with Disabilities Act (ADA). Students with disabilities may request course-related accommodations by contacting the Educational Access Center (EAC), located in the Bond Academic Center ([EAC@pointloma.edu](mailto:EAC@pointloma.edu) or 619-849-2533). Once a student's eligibility for an accommodation has been determined, the EAC will work with the student to create an Accommodation Plan (AP) that outlines allowed accommodations. Professors are able to view a student's approved accommodations through Accommodate.

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. Accommodations are not retroactive so clarifying with the professor at the outset is one of the best ways to promote positive academic outcomes.

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. Students cannot assume that

because they had accommodations in the past, their eligibility at PLNU is automatic. All determinations at PLNU must go through the EAC process. This is to protect the privacy of students with disabilities who may not want to disclose this information and are not asking for any accommodations.

### **Additional Course Information**

Additional PLNU policies and practices that apply to this course can be found at the following link:

<https://docs.google.com/document/d/11BgAANLOJ9tjt837d24EZ181ukM2qzHF/edit>

## Assignments At-A-Glance

Week	Date	In Class	Mini-lecture	Items Due	Milestone	
1	1/14/2026	Discuss syllabus, class plan, proposal assignment, and Design of Experiments	Experimental Design	Entrance survey		
2	1/21/2026	Work on proposal/discuss with professor and peers, finalize prototypes		Team contracts		
3	1/28/2026	Peer review proposals		Draft proposals (before class)	Draft proposal submitted to AgInno for feedback	
4	2/4/2026	Data collection and analysis, design optimization		Proposal (before class)		
5	2/11/2026	Data collection and analysis, design optimization	Faith, Engineering, and Professional Ethics			
6	2/18/2026	Data collection and analysis, design optimization				
7	2/25/2026	Data collection and analysis, design optimization				
8	3/4/2026	Data collection and analysis, design optimization (guest professor)	Safety in Engineering Design (Prof. Zark)			
9	3/11/2026	Spring Break (No Class)				
10	3/18/2026	Present progress reports, discuss manual sections	Technical Manuals	Progress report (before class)		
11	3/25/2026	Clean up lab space/equipment, work on manuals				
12	4/1/2026	Finalize designs and parts lists, work on manuals				
13	4/8/2026	Peer review manuals	Professional Relationships	Draft-final technical manual		
14	4/15/2026	Senior survey, teamwork evals, technical writing assessment, work on final report/presentation	Formal Peer-review Process	Final tech. manual (before class), senior survey and teamwork evals (end of class)	Final manuals submitted to AgInno	
15	4/22/2026	Peer review report sections (formal)		Draft-final report (before class) and comment sheets (end of class)		
16	4/29/2026	Practice presentation with peer feedback		Final report and comment responses (end of week)	Final report submitted to AgInno	
17	TBD	Final presentation (final exam session) - Time and place TBD		Presentation slides (end of class)	Final presentation files submitted to AgInno	

Please note the course schedule is subject to minor changes throughout the semester; refer to the Canvas course home page for the updated schedule.