



Physics and Engineering

EGR 2014/2014L – Engineering Mechanics: Statics

Number of Units: 3+1

Spring 2025

Meeting days/times: Lecture: MWF 11:00 am – 11:55 am | Lab: T 10:30am-1:20pm

Meeting location: Rohr Science (RS) 365

Final Exam: Monday, 05/05, 10:30am – 1:00 pm

INFORMATION	SPECIFICS FOR THE COURSE
Instructor title and name:	Dr. Anthony Cortez
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Office location and hours:	Rohr Science 282 by appointment

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

EGR 2014 – Engineering Mechanics: Statics (3)

Statics of particles and rigid bodies as applied to engineering design. Topics include vector algebra, forces, moments and couples, conditions of equilibrium, friction, and virtual work.

Prerequisite(s): PHY 2044 with a grade of C- or higher.

Corequisite(s): EGR 2014L

EGR 2014L – Engineering Mechanics: Statics Lab (1)

A lab course designed for a hands-on exploration of Engineering Mechanics. Meets two hours per week.

Prerequisite(s): PHY 2044 with a grade of C- or higher.

Corequisite(s): EGR 2014

Program and Course Learning Outcomes

Course Learning Outcomes:

1. Gain a fundamental understanding of Engineering Mechanics.
2. Accurately identify forces and moments on a real world system.
3. Accurately draw a free-body diagram in 2D and 3D.
4. Accurately arrive at the equations of equilibrium of a system in 2D and 3D.
5. Develop written communication skills through detailed procedures in labs.
6. Apply knowledge from course material to successfully set up experimental equipment and effectively carry out lab procedures.
7. Effectively collaborate in teams.

The PLOs assessed in this class are:

- An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics. (LO1)
- An ability to apply recognize ethical and professional responsibilities and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts. (LO4)

The Signature Assignment for assessing these PLOs is the final exam.

Required Texts and Recommended Study Resources

Engineering Mechanics: Statics by Hibbeler, Russell C. – 14th Edition

Students are responsible for having the required course textbooks prior to the first day of class.

All supplemental materials posted on this course site (including articles, book excerpts, or other documents) are provided for your personal academic use. These materials may be protected by copyright law and should not be duplicated or distributed without permission of the copyright owner.

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 3+1 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 150 total hours meeting the course learning outcomes. The time estimations are provided in the Canvas modules.

Assessment and Grading

Grades will be based on the following:

- **Homework:** Homework will be assigned weekly and a physical copy is due at the start of class the following week.
- **Labs:** Labs will provide hands on applications of the engineering mechanics we are learning in lecture. Each lab you will be generating a document of procedures to submit at the end of the scheduled lab time. A detailed lab report will be submitted the following week. The labs are designed to enhance your understanding of the course with hands on materials, communicate your understanding in writing, and efficiently work in small teams.
- **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.

Sample Standard Grade Scale Based on Percentages

Grading Distribution	Percent
Exams	30
Final Exam	30
Homework	15
Labs	25
Total	100

Standard Grade Scale Based on Percentages					
	A	B	C	D	F
+		87.5- 89.5	77.5-79.5	67.5-69.5	
	91 -100	81-87.5	71-77.5	61 -67.5	0-57
-	89.5-91	79.5-81	69.5-71	57-61	

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 [Traditional Undergraduate Records: Final Exam 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.

Incompletes and Late Assignments

All assignments are to be submitted by the due dates. Assignments will be considered late if posted after the due date and time using Pacific Standard Time. Late assignments will receive a grade of 0.

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 or 619-849-2486). 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. The EAC makes accommodations available to professors at the student's request.

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 special accommodations.

Tentative Schedule (Subject to Updates)

Date	Topic	Reading	HW Due
13-Jan (WEEK 1)	Introductions and Unit Analysis	Ch.1	
15-Jan	Vector Operations	2.1-2.2	
17-Jan	Vector Addition and Cartesian Vectors	2.3-2.4	
20-Jan (WEEK 2)	MLK Day NO CLASS		
22-Jan	3D Cartesian Vectors and Addition	2.5-2.6	HW 1
24-Jan	Position Vectors and Dot Product	2.7-2.9	
27-Jan (WEEK 3)	Free-Body Diagram and Coplanar Forces	3.1-3.3	HW 2
29-Jan	3D Force Systems	3.4	
31-Jan	Moment of a Force	4.1	
3-Feb (WEEK 4)	Moment of a Force Vector	4.2-4.4	HW 3
5-Feb	Moment of a Force about an Axis	4.5	
7-Feb	Moment of a Couple	4.6	
10-Feb (WEEK 5)	Exam 1		HW 4
12-Feb	Simplification of a Force and Couple System	4.7-4.8	
14-Feb	Reduction of a Simple Distributed Loading	4.9	
17-Feb	Equilibrium and FBD of a Rigid Body	5.1-5.2	HW 5

(WEEK 6)			
19-Feb	Equations of Equilibrium	5.3	
21-Feb	Two and Three Force Members	5.4	
24-Feb (WEEK 7)	Equilibrium in 3D	5.5-5.7	HW 6
26-Feb	Simple Trusses	6.1-6.2	
28-Feb	Zero-Force Members	6.3	
3-Mar (WEEK 8)	The Method of Sections	6.4	HW 7
5-Mar	Frames and Machines	6.6	
7-Mar	Exam 2		
10-14 Mar	Spring Break NO CLASSES		
17-Mar (WEEK 9)	Frames and Machines cont.	6.6	HW 8
19-Mar	Internal Forces	7.1	
21-Mar	Shear and Moment	7.2	
24-Mar (WEEK 10)	Distributed Load, Shear, and Moment	7.3	HW 9
26-Mar	Dry Friction	8.1	
28-Mar	Dry Friction Continued	8.1-8.2	
31-Mar (WEEK 11)	Wedges	8.3	HW 10
2-Apr	Frictional Forces on Screws	8.4	
4-Apr	Frictional Forces on Flat Belts	8.5	
7-Apr (WEEK 12)	Rolling Resistance	8.8	HW 11
9-Apr	Friction Applications Cont.	Ch.8	
11-Apr	Centroid of a Body	9.1	

14-Apr (WEEK 13)	Centroid of a Body cont.	9.1-9.2	HW 12
16-Apr	Exam 3		
17-21 Apr	Easter – NO CLASSES		
23-Apr (WEEK 14)	Composite Bodies	9.2	
25-Apr	Moments of Inertia	10.1-10.3	
28-Apr (WEEK 15)	Moments of Inertia for Composite Areas	10.4	HW 13
30-Apr	Catch Up		
2-May	Review		HW 14
5-May	Final Exam @ 10:30am		

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/18i1pUoY0iCfB8w7JKxVvACQW309X-JRB/edit?usp=sharing&oid=116164865489739533893&rtpof=true&sd=true>