



Physics and Engineering

EGR 2014/2014L – Engineering Mechanics: Statics

Number of Units: 3+1

Spring 2024

Meeting days/times

Lecture: (MWF 8:30 am – 9:25 am)

Lab: (T 10:30am – 1:20pm)

Meeting location

Lecture: (Rohr Science Hall 265 (RS 265))

Lab: (Rohr Science Hall 395 (RS 395))

Instructor title and name:	Dr. Anthony Cortez
Phone:	(619) 849-2439
Email:	AnthonyCortez@pointloma.edu
Office location and hours:	Office Hours: MF: 9:30-10:30am R: 8:45-9:45am By Appointment Location: Rohr Science 282

Final Exam: (Wed, 5/1, 7:30 – 10:00 am)

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 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

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.

Student Outcomes Addressed:

- 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)

Required Texts and Recommended Study Resources

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

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 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 material 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.

Grading Distribution	Percent
Exams	45
Final Exam	30
Homework	10
Labs	15
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 [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.

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.

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.

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.

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 drop date or, after that date, receive an "F" grade.

Tentative Schedule (Subject to Updates)

Date	Topic	Reading	HW Due
8-Jan (WEEK 1)	Introductions and Unit Analysis	Ch.1	
10-Jan	Vector Operations	2.1-2.2	
12-Jan	Vector Addition and Cartesian Vectors	2.3-2.4	
15-Jan (WEEK 2)	MLK Day NO CLASS		
17-Jan	3D Cartesian Vectors and Addition	2.5-2.6	HW 1
19-Jan	Position Vectors and Dot Product	2.7-2.9	
22-Jan (WEEK 3)	Free-Body Diagram and Coplanar Forces	3.1-3.3	HW 2
24-Jan	3D Force Systems	3.4	
26-Jan	Moment of a Force	4.1	
29-Jan (WEEK 4)	Moment of a Force Vector	4.2-4.4	HW 3
31-Jan	Moment of a Force about an Axis	4.5	
2-Feb	Moment of a Couple	4.6	
5-Feb (WEEK 5)	Exam 1		HW 4
7-Feb	Simplification of a Force and Couple System	4.7-4.8	
9-Feb	Reduction of a Simple Distributed Loading	4.9	
12-Feb (WEEK 6)	Equilibrium and FBD of a Rigid Body	5.1-5.2	HW 5
14-Feb	Equations of Equilibrium	5.3	

16-Feb	Two and Three Force Membranes	5.4	
19-Feb (WEEK 7)	Equilibrium in 3D	5.5-5.7	HW 6
21-Feb	Simple Trusses	6.1-6.2	
23-Feb	Zero-Force Members	6.3	
26-Feb (WEEK 8)	The Method of Sections	6.4	HW 7
28-Feb	Frames and Machines	6.6	
1-Mar	Exam 2		
4-8 Mar	Spring Break NO CLASSES		
11-Mar (WEEK 9)	Frames and Machines cont.	6.6	HW 8
13-Mar	Internal Forces	7.1	
15-Mar	Shear and Moment	7.2	
18-Mar (WEEK 10)	Distributed Load, Shear, and Moment	7.3	HW 9
20-Mar	Dry Friction	8.1	
22-Mar	Dry Friction Continued	8.1-8.2	
25-Mar (WEEK 11)	Wedges	8.3	HW 10
27-Mar	Frictional Forces on Screws	8.4	
28-Mar – 1-Apr	Easter – NO CLASSES		
3-Apr (WEEK 12)	Frictional Forces on Flat Belts	8.5	HW 11
5-Apr	Rolling Resistance	8.8	

8-Apr (WEEK 13)	Exam 3		HW 12
10-Apr	Friction Applications Cont.	Ch.8	
12-Apr	Centroid of a Body	9.1	
15-Apr (WEEK 14)	Centroid of a Body cont.	9.1-9.2	HW 13
17-Apr	Composite Bodies	9.2	
19-Apr	Moments of Inertia	10.1-10.3	
22-Apr (WEEK 15)	Moments of Inertia for Composite Areas	10.4	HW 14
24-Apr	Catch Up		
26-Apr	Review		HW 15
1-May	Final Exam @ 7:30am		