POINT 1902 LOMA
NAZARENE UNIVERSITY

Physics and Engineering

EGR3043 Analytical Mechanics- Dynamics

3 Units

Spring 2025

Meeting days/times: MWF 1:30 pm – 2:25 pm

Meeting location: Rohr Science (RS) 365

Final Exam: Wednesday, 05/07, 1:30 – 4:00 pm

INFORMATION	SPECIFICS FOR THE COURSE
Instructor title and name:	Dr. Anthony Cortez
Phone:	619-849-2349
Email:	acortez@pointloma.edu
Office location and hours:	RS 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

Newtonian mechanics, dynamics of particles and rigid bodies, oscillatory motion, central forces, inertial tensors, Lagrangian and Hamiltonian formulations.

Program and Course Learning Outcomes

The PLOs assessed in this class are:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics (CC: CT)

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

Required Texts and Recommended Study Resources

Classical Mechanics by John Taylor, University Science Books 2005.

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 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 112.5 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.
- **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

Standard Grade Scale Based on Percentages					
	A	**B**	**C**	**D**	**F**
+		87.5- 89.5	77.5-79.5	67.5-69.5	

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

Grading Distribution	**Percent**
Homework	30
Exams	30
Final Exam	40
Total	100

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/turned in by the beginning of the class session when they are due—including assignments posted in Canvas. Late assignments will receive a score of zero.

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**
M 01/13/25	Introduction	
W 01/15/25	Newton's Law of Motion	Chapter 1
F 01/17/25	Newton's Law of Motion	Chapter 1
M 01/20/25	**No Class: Martin Luther King Day**	
W 01/22/25	Projectiles and Charge Particles	Chapter 2
F 01/24/25	Projectiles and Charge Particles	Chapter 2
M 01/27/25	Projectiles and Charge Particles	Chapter 2
W 01/29/25	Momentum and Angular Momentum	Chapter 3
F 01/31/25	Momentum and Angular Momentum	Chapter 3
M 02/3/25	Momentum and Angular Momentum	Chapter 3
W 02/05/25	Energy	Chapter 4
F 02/07/25	Energy	Chapter 4
M 02/10/25	Energy	Chapter 4
W 02/12/25	Catch Up	
F 02/14/25	Oscillations	Chapter 5
M 02/17/25	**Test 1**	
W 02/19/25	Oscillations	Chapter 5
F 02/21/25	Oscillations	Chapter 5
M 02/24/25	Oscillations	Chapter 5
W 02/26/25	Oscillations	Chapter 5
F 02/28/23	Calculus of Variations	Chapter 6
M 03/03/25	Lagrange's Equations	Chapter 7
W 03/05/25	Lagrange's Equations	Chapter 7

F 03/07/25	Lagrange's Equations	Chapter 7
M 03/10/25	**Spring Break**	
W 03/12/25	**Spring Break**	
F 03/14/25	**Spring Break**	
M 03/17/25	Lagrange's Equations	Chapter 7
W 03/19/25	Two-Body Central-Force Problems	Chapter 8
F 03/21/25	Catch Up	
M 03/24/25	**Test 2**	
W 03/26/25	Two-Body Central-Force Problems	Chapter 8
F 03/28/25	Two-Body Central-Force Problems	Chapter 8
M 03/31/25	Two-Body Central-Force Problems	Chapter 8
W 04/02/25	Mechanics in Noninertial Frames	Chapter 9
F 04/04/25	Mechanics in Noninertial Frames	Chapter 9
M 04/07/25	Mechanics in Noninertial Frames	Chapter 9
W 04/09/25	Mechanics in Noninertial Frames	Chapter 9
F 04/11/25	Mechanics in Noninertial Frames	
M 04/14/25	Review	
W 04/16/25	**Test 3**	
F 04/18/25	**Easter Recess (No Class)**	
M 04/21/25	**Easter Recess (No Class)**	
W 04/23/25	Rigid Body	Dynamics Textbook
F 04/25/25	Rigid Body	Dynamics Textbook
M 04/28/25	Rigid Body	Dynamics Textbook
W 04/30/25	Rigid Body	Dynamics Textbook
F 05/02/25	Final Review	
M 05/05/23		
W 05/07/23	**Final Exam: 1:30 - 4:00 pm**	
F 05/09/23		

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&ouid=116164865489739533893&rtpof=true&sd=true