Phy341: Analytical mechanics (4) Fall 2015

Instructor: Dr. Paul D. Schmelzenbach	Meeting: 8:30-9:35 MWF (RS 219)
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Office Hours: R 9:00-11:00; 12:30-1:30 MWF	Office Location: RS 207

Materials – *Classical Dynamics of Particles and Systems* by Thornton and Marion, 5th edition. Published by Brooks/Cole 2008. Access to MATLAB (or similar program). Graphing Calculator.

Description – The goal of this course is to understand Classical Mechanics at an intermediate level. Mechanics is the study of how things move from subatomic particles, to cars and rockets, through the rotation of galaxies and beyond. We will begin with Newton's approach you learned in University physics, apply it to more complicated problems, and continue on with more powerful and advanced techniques such as the the Lagrangian approach which can allow one to solve much more complex motion problems with comparative ease.

Learning Outcomes – This course supports the overall learning objectives of the physics and engineering programs to: develop an understanding of the fundamental principles of physics and apply physical principles, mathematical reasoning, and computational techniques to solve real-world problems .

Within these broader outcomes, in this course you will

1. Translate a physical description of a classical mechanics problem to a math equation necessary to solve it.
2. explain the physical meaning of the mathematical formulation
3. articulate the big ideas from each section
4. sketch the physical parameters (the situation and coordinates) of a problem
5. justify and explain your thinking and approach to a problem or physical situation in written or oral form
6. when appropriate for a given problem you should be able to predict your expectations of a problem (such as direction of a force, dependence on coordinate variables, or behavior at large distances or times) and in all cases evaluate the reasonableness of a solution.
7. apply computational techniques to help in solving mechanics problems
8. correctly apply problem solving techniques such as approximations and series expansions

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Homework – Homework is exceedingly important for developing an understanding of the course material, not to mention building skills in complex physical and mathematical problem solving. They will require considerable time and personal effort this term. Remember that it is not the solution that itself that is the true goal, it is the process to the solution that will develop your skill as a physicist or engineer.

Submission format:

Work the problem in clear logical steps. Solutions should be clear enough one of your peers could follow your steps if they had not worked the problem before. In particular you should (1) carefully draw figures, (2) define variables, (3) have a box drawn around your final answer, (4) include units, and (5) if applicable a statement of the solution if it is reasonable, or if not, why (6) submit answers written in pencil in neat, legible work.

Collaboration: I expect and encourage collaboration between you and your peers while working on your homework. (Most good ideas come out of discussions with colleagues. This skill is highly valued by employers, and virtually all science and engineering takes place within groups or teams.) That being said, your work should be your *own original solution.* Allow adequate time to work and think about problems by yourself first before you work together with your peers or ask questions of me. The guideline is that you should have no trouble explaining or repeating work that you turn in.

Exams – Three exams will be given during the semester, and the final exam is at 7:30 on Friday of finals week.

Project – We will be creating projects that use the principles of mechanics. The goal is that you will produce a journal-type article describing the situation you analyze, the methods you use, and some basic conclusions. We will have several check-in points during the semester to help you plan out your work on this project. More details will be given in class.

Preclass questions Each class day there will be three Preclass questions to answer electronically. These will be due by midnight the day of class. Your responses to Preclass questions are graded on the following scale: 2=demonstrates reading/thinking; 1=room for improvement, 0=unsatisfactory.

Final Grades – The grade you earn in this course is based on the scale shown to the right. The points you receive during the course are weighted accordingly:

- Homework: 25%
- Tests (3): 30%
- Preclass Summaries: 10%
- Project: 15%
- Final Exam: 25%

A	100 - 91.0
A-	91.0 - 89.5
B+	89.5 - 87.0
B	87.0 - 81.0
B-	81.0 - 79.5
C+	79.5 - 77.0
C	77.0 - 71.0
C-	71.0 - 69.5
D+	69.5 - 67.0
D	67.0 - 61.0
D-	61.0 - 55.0

Academic Integrity – All students are expected to uphold the highest standards of honesty and integrity in their academic work. Cheating or plagiarism may result at a minimum in failure on the assignment and may result in an automatic failure in this course.

Academic Accommodations – While all students are expected to meet the minimum academic standards for completion of this course as established by the instructor, students with disabilities may require academic accommodations. At Point Loma Nazarene University, students requesting academic accommodations must file documentation with the Disability Resource Center (DRC), located in the Bond Academic Center. Once the student files documentation, the Disability Resource Center will contact the student's instructors and provide written recommendations for reasonable and appropriate accommodations to meet the individual learning needs of the student. This policy assists the University in its commitment to full compliance with Section 504 of the Rehabilitation Act of 1973, the Americans with Disabilities (ADA) Act of 1990, and ADA Amendments Act of 2008, all of which prohibit discrimination against students with disabilities and guarantees all qualified students equal access to and benefits of PLNU programs and activities.

FERPA Policy As a student at Point Loma, you have a legal right to privacy as outlined in the federal FERPA (Family Educational Rights and Privacy Act) legislation. See Policy Statements for full text.