

Physics 103: Intermediate Mechanics

MWF 9:30-10:50 AM, Phelps 3519

Discussion Section: R 8:00-9:20 AM, Phelps 1508

Summer 2015

Instructor: Keith Fratus

E-mail: fratus@physics.ucsb.edu

Office Hours: TBA

TA: TBA

TA E-mail: TBA

TA Office Hours: TBA

Course Web Site: <http://web.physics.ucsb.edu/~fratus/phys103/>

Course Description

Physics 103 is the intermediate-level mechanics course here at UCSB. As an intermediate course in classical mechanics, it revisits some of the topics you previously encountered in freshman mechanics, this time making full use of the additional mathematical tools you have learned since then (basic differential equations, etc.). In addition, there will be a selection of new topics that we will cover for the first time.

Time permitting, the list of topics covered will be:

Newton's Laws of Motion

Dissipative Forces and Retarding Motion, Air Resistance

Conservation Laws - Energy, Linear Momentum, and Angular Momentum

Simple Harmonic Motion and Normal Modes

Damped Oscillations, Forced Oscillations, and Resonance Behaviour

Fourier Analysis and Green's Functions

Newton's Law of Gravitation

Tidal Forces and Kepler's Laws of Planetary Motion

Scattering and Cross Sections

Introduction to Special Relativity

A more detailed, day-by-day schedule of topics will be posted on the course web page.

Textbook

The textbook we will be using is *Classical Mechanics* by John R. Taylor, covering primarily chapters 1-5, 8, 11, 14, and 15. Motivated students who want to get a head start on the material in Physics 104 are of course encouraged to read through the remaining chapters, especially chapters 6 and 7 on Lagrangian Mechanics!

Additionally, I will be posting my lecture notes on the course web site.

Grading

Your course grade will be determined through a combination of homework, midterm, and final exam grades. They will contribute to your final grade as follows:

Homework: 40%

Midterm: 25%

Final: 35%

There will be **five** homework sets, assigned on a roughly weekly basis. These homework assignments will be posted on the course web page. The due date for each homework will be specified on the homework assignment, and it will also be listed online. Late homework will be accepted at the discretion of the TA. Please keep in mind that in a summer course with an accelerated pace, solutions to the homework sets will be posted promptly, after which no late homework can be accepted. Please write out your homeworks in a neat and legible manner! The TA reserves the right to assign zero credit to any homework problems that are illegible and impossible to read.

The midterm and final exams will be held **outside** of class, during an officially scheduled exam block. The time, date, and location of the exams will be posted online as soon as this information is confirmed with the registrar. The final exam will be cumulative (with a focus on more recent material), and will be worth more than the midterm. A set of detailed exam policies will be posted on the course web page in advance of the first exam. Please note that if you have special test-taking considerations, you must notify the Disabled Students Program (DSP) **10** days prior to the exam.

Accelerated Pace of Summer Session

Please note that because our course is only six weeks long, it will proceed at a faster pace than when it is offered during the normal school year. One of the most common complaints from students during summer session is that material is covered more quickly, and that they have more homework per week, as compared with the normal school year. This is indeed the case, and it is inevitable. Please remember that you are getting **full credit for having completed Physics 103**. Summer session is designed to give you an opportunity to get this out of the way during the summer, when you have fewer commitments, and thus can

dedicate more time to the class. It is **NOT** designed to let you get credit for a course while only doing 60% of the work! Note that we will have **three long block** lectures each week, instead of two, which means you should expect the course to proceed about 50% faster than usual.

Special Homework Policy

In this course, 40% of your grade will be determined by homework. This is designed to reward students who put time into working on problems, and to avoid putting too much emphasis on any one exam. However, as with any course, it is always possible that students are dishonest in the completion of their homework, and are not actually the ones doing the work. When a student is not the one who is actually completing their homework, it is typically reflected in a discrepancy between their homework and exam grades.

Because of this, in order to discourage students from homework cheating, I have a special policy regarding course grades. If a student performs exceptionally well on their homework (95% or better), yet performs exceptionally poorly on **both** of their exams (25% or worse on **both** exams), I reserve the right, if I find it necessary, to alter the grading scheme for that student, and instead compute their final course grade as follows:

Homework: 20%

Midterm: 35%

Final: 45%

Please note that this policy is not designed to penalize students who test poorly. I have never witnessed a scenario in which a student put in an honest effort on the homework and had such a large discrepancy on their homework and test grades. It is only designed to penalize students who are clearly not the ones doing their homework. **If you are honest about completing your own homework, there should be no reason for you to concern yourself with this policy.**