Syllabus: Mechanics (PHYS 204A)
Dr. Nicholas Nelson, Spring 2016
Lecture: PHSC 301, MWF 2:00-2:50
Lab: PHSC 106, Th 2:00-4:5

How to Talk to Me
E-mail: ninelson@csuchico.edu (Preferred)
Phone/Text: 503-385-6455 (8 AM to 6 PM, Mon.-Sat. only)
Office Hours: T 1:00 PM to 3:00 PM in PHSC 122
Syllabus, Homework, and Course Info on Blackboard

What You Should Already Know
To succeed in this course you will need to have a strong grasp of algebra, trigonometry, and first semester calculus, as well as be at least concurrently enrolled in second semester calculus (MATH 121). You will use these math skills extensively. If you have concerns about your preparation, please come talk to me as soon as possible.

What You Will Learn
At the conclusion of the course, you should be able to:
1. Understand and apply vector arithmetic
2. Quantitatively decide if a dataset is consistent with a theoretical prediction
3. Design experiments to test a theoretical model
4. Apply Newton’s Laws of Motion to everyday objects
5. Use Newton’s 2nd Law to relate forces and accelerations
6. Use conservation laws to describe interactions and collisions
7. Understand Newtonian gravity

How You Will Learn It
This class has five major components: the textbook, group work/lectures, lab work, weekly homework, and exams.

Textbooks: We will be using Physics for Scientists and Engineers: A Strategic Approach with Modern Physics, by Randall D. Knight, 3rd Edition. We not will be using MasteringPhysics, so used copies of either the 2nd or 3rd edition are fine. You can buy the 2nd edition used for about $50 on Amazon.

The Physics 204A Laboratory Manual is available for purchase from the Society of Physics Students on the first day of lab. You will need your own print copy. Manuals generally cost about $15.

Group Work/Lectures: Our MWF classes will be devoted primarily to guided group work. We will use iClickers heavily. You will need your own. Either iClickers or iClicker 2s will work. We will begin using clickers immediately but grading will begin the second week of class, so please purchase and register your clicker as soon as possible. Each day you will need your clickers and some scratch paper. Clicker questions will be worth 1 point each for participation. You will generally be asked to work individually, in pairs, or small groups on
problems which we will then discuss together as a class. You are allowed to miss 10 clicker questions (roughly 2 classes) over the semester without penalty for any reason. We will spend some time each Wednesday preparing for the lab sessions on Thursday or Friday, and time each Friday talking about the results of the labs. If possible it will be helpful for at least one member of each lab group to bring a laptop or tablet to class on Wednesdays.

**Lab Work:** I consider our weekly lab sessions to be the most valuable class time. We will spend this time conducting physics experiments to test the theoretical predictions made by our models. These labs will be done in groups of 3-4 (not 5). You will work with your chosen group for roughly 4 labs, then we will choose new groups for the next roughly 4 labs, and so on. I may reorganize groups as I see fit. Each group will be responsible for creating a collaborative lab write-up using Google Docs, however each individual group member must (a) put their name at the top of the document, (b) have the document shared with them, and (c) send me their own conclusion separately via email. **If you don't do these three things you will not receive credit for completing the lab.** I do not accept late labs or conclusions.

When you create your lab document please change the sharing settings so that anyone with a CSU-Chico email address can comment on the doc and then send an email with a link to your doc to njnelson@csuchico.edu (not mail.csuchico.edu). Lab reports and conclusions are due by the end of the day on Monday of the week following the lab. You may miss one lab for any reason, however **IF YOU MISS TWO OR MORE LABS YOU WILL NOT PASS THIS COURSE.** There will be no labs on March 31st/April 1st due to Cesar Chavez Day.

**Homework:** I will assign roughly weekly problem sets. **Problem sets are due each Wednesday at the start of class (2 PM).** I will not accept late homework. Problem sets will generally consist of ten problems. Neatness counts — if I can’t read it then you won’t get credit. Help us both out by doing one homework problem per page. If your handwriting is as bad as mine, please compensate by leaving large amounts of whitespace. **If I can't follow your logic then you won't get any credit, so please draw diagrams with clear labels, leave comments and explanations, and be careful with units!**

You are strongly encouraged to work in pairs, small groups, or together as a class on your homework with the stipulations that any work you turn in be the result of your own fingers directing your own writing implement, and that you clearly identify those with whom you work by listing their names on the top of the first page. I reserve the right to break-up any collaboration for any reason.

**Exams:** There will be two midterms and a final exam in this course. The exams will consist of a mixture of quantitative and qualitative questions. **No phones or calculators will be allowed.** For each exam you will be allowed to bring one 8.5” x 11” sheet of standard paper with notes. These “cheat sheets” may contain anything you find useful. The only restrictions are that the notes be handwritten by you and must be turned in with your exam. Awards will be given to the finest cheat sheets for each exam.

**How You Will Be Graded**
Your grade will be computed as follows:
• Professionalism — 10%
• Class Participation — 10%
• Lab Reports — 20%
• Homework — 25%
• Midterms — 20% (10% each)
• Final Exam — 15%

Grades will be regularly updated on Blackboard. If you find yourself unhappy with your grade at any point during this class please come speak with me as soon as possible. **I will bend over backwards to work with any student who earnestly and diligently commits to this course.**

Drop-in tutors (upper-division physics students) are available for tutoring— see their schedule posted in PHSC 110. Physics 204X is a 1-unit study and discussion session designed to accompany Physics 204A. You don’t need to register to attend, but if you do register, you do need to attend a minimum number of sessions to obtain credit. I strongly encourage you to take advantage of this resource.

I will hold office hours every Tuesday from 1 PM to 3 PM in my office space (PHSC 122). During that time I will also be available on a Google Hangout with a link posted on Blackboard Learn. Additionally I am often available in my office (PHSC 122), so please feel free to drop in if you have questions. The first 5 students to copy this sentence into an email and send it to me get 5 extra credit points on their first homework. My experience has shown that students who take advantage of my office hours will do better in this course than those who do not.

**What I Expect From You**

Due diligence is defined as a measure of prudence, activity, assiduity, effort, expediency, and/or disclosure, as is properly to be expected from, and ordinarily exercised by, a reasonable and prudent person under the particular circumstances. If you exercise due diligence with respect to your responsibilities in this course, you will find that I am very sympathetic and will work very hard to resolve any problems that come up to the satisfaction of both you and me. If you are negligent you can expect very little from me.

The professionalism component of your grade is designed to encourage you to be respectful of my time and effort. If you do unprofessional things like whine about your grade, pester me about your grade, or beg for a better grade, I will give you what you ask for and then reduce your professionalism grade to zero. I will warn you prior to reducing your professionalism grade, so take those warnings seriously. In my previous experience almost all students get full credit for professionalism.

Academic integrity (as defined by the campus Academic Integrity statement available at [http://www.csuchico.edu/prs/EMs/2004/04-036.shtml](http://www.csuchico.edu/prs/EMs/2004/04-036.shtml)) is required in all you do in this course. If you violate those standards you will fail my class and be reported to Student Judicial Affairs. In particular, **the use of any electronic device (including a calculator) during an exam will be considered cheating.**
**What You Can Expect From Me**
I love physics. If you don’t get excited about anything we study this semester I will consider it a failure on my part. I will do my best to be respectful of your time and effort. I will strive to make every reading, class session, homework assignment, lab, and exam as useful to your learning as possible. I will listen to and respectfully consider any comments or suggestions you have about any aspect of this course. I will be respectful of any protected status recognized by the university, as well as many that are not, assuming that you are duly diligent in alerting me to any possible issues before or as they arise. I will not tolerate harassment or bullying.

**University Policies**
I will adhere to the policies outlined at [http://www.csuchico.edu/celt/Teaching%20Resources/Syllabus%20Elements%20.shtml](http://www.csuchico.edu/celt/Teaching%20Resources/Syllabus%20Elements%20.shtml).
## Approximate Schedule

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Text</th>
<th>Lab</th>
<th>Homework/Exams</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/25</td>
<td>Newton's 1st Law</td>
<td>Chapters 1 &amp; 2</td>
<td>5.1 - Intro to Mechanics Lab</td>
<td></td>
</tr>
<tr>
<td>2/1</td>
<td>Vectors</td>
<td>Chapter 3</td>
<td>5.2 - Intro to Motion</td>
<td>HW #0 Due</td>
</tr>
<tr>
<td>2/8</td>
<td>Motion in 2D</td>
<td>Chapter 4</td>
<td>5.3 - Free Fall</td>
<td>HW #1 Due</td>
</tr>
<tr>
<td>2/15</td>
<td>Forces</td>
<td>Chapter 5</td>
<td>5.4 - Projectile Motion</td>
<td>HW #2 Due</td>
</tr>
<tr>
<td>2/22</td>
<td>Newton's 2nd Law</td>
<td>Chapter 6</td>
<td>Intro to Force</td>
<td>HW #3 Due</td>
</tr>
<tr>
<td>2/29</td>
<td>Newton's 3rd Law</td>
<td>Chapter 7</td>
<td>5.5 - Newton's 2nd Law</td>
<td>Midterm #1</td>
</tr>
<tr>
<td>3/7</td>
<td>Dynamics in 2D</td>
<td>Chapter 8</td>
<td>5.6 - Friction</td>
<td>HW #4 Due</td>
</tr>
<tr>
<td>3/14</td>
<td>Spring Break</td>
<td>No Lab</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3/21</td>
<td>Momentum</td>
<td>Chapter 9</td>
<td>5.7 - Centripetal Force</td>
<td>HW #5 Due</td>
</tr>
<tr>
<td>3/28</td>
<td>Energy</td>
<td>Chapter 10</td>
<td><strong>No Lab (Cesaer Chavez Day)</strong></td>
<td>HW #6 Due</td>
</tr>
<tr>
<td>4/4</td>
<td>Work</td>
<td>Chapter 11</td>
<td>5.10 - Momentum and Energy</td>
<td>HW #7 Due</td>
</tr>
<tr>
<td>4/11</td>
<td>Rotational Dynamics</td>
<td>Chapter 12</td>
<td>5.8 - Work and Energy</td>
<td>Midterm #2</td>
</tr>
<tr>
<td>4/18</td>
<td>Static Equilibrium</td>
<td>Chapter 12</td>
<td>5.11 - Moment of Inertia</td>
<td>HW #8 Due</td>
</tr>
<tr>
<td>4/25</td>
<td>Newtonian Gravity</td>
<td>Chapter 13</td>
<td>5.13 - Static Equilibrium</td>
<td>HW #9 Due</td>
</tr>
<tr>
<td>5/2</td>
<td>Oscillations</td>
<td>Chapter 14</td>
<td>5.14 - Simple Pendulum</td>
<td>HW #10 Due</td>
</tr>
<tr>
<td>5/9</td>
<td>Semester Review</td>
<td></td>
<td>Not So Simple Pendulum</td>
<td>HW #11 Due</td>
</tr>
<tr>
<td>5/16</td>
<td>Final Exam</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>