PHYSICS 218: Mechanics (Spring 2015)

Instructor
Alexei V. Sokolov
Office: Mitchell Physics Building, Room 543
Phone: 845-7733, E-mail: sokol@physics.tamu.edu
Office hours: Monday 9:30 to 11:30 a.m., and by appointment
Web Page: http://physics218.physics.tamu.edu for general information
http://faculty.physics.tamu.edu/sokol/sokolov.htm for my own homepage

Course overview
Physics 218, Mechanics, is the first semester of a two-semester sequence in introductory physics, intended to introduce students to the basic principles of Newtonian mechanics and harmonic motion. We will cover topics in mechanics, Newton's Laws, the concepts of energy and work, conservation of energy and momentum, rotational motion, gravity, harmonic motion and waves. This corresponds to chapters 1–11 and 13–15 of the textbook. The course is taught with pre-lectures, lectures, recitations and laboratories. The pre-lectures present the core concepts prior to class and allow more time for problem-solving strategies in class as compared to traditional lectures. The recitation is meant to practice problem-solving and to sharpen your reasoning about physics in a smaller class-size setting than the main lecture (which will have close to 150 students in it). And of course the laboratory is an integral part of understanding physical processes. The material is presented at a level that requires significant algebra and trigonometry, as well as some basic calculus.

Upon successfully completing this course, you will have come to understand the basic principles governing the motion of objects, learned to think more critically/scientifically, and developed the skills needed to attack difficult problems. These are all skills that will serve you in your future courses and careers, even if you never again consider a block sliding down an incline.

Most of the information outlined below can be found on our main course website: http://physics218.physics.tamu.edu

Course Schedule
Our lectures are at MPHY 203, on MWF, 12:40 pm till 1:30 pm.
The weekly class and lab schedule gives an outline of the course (but is by no means cut in stone):
The weekly Pre-In-Class Exercises (pre-ICE) for recitations can be found and downloaded here:
http://physics218.physics.tamu.edu/pre-ICE.shtml

Required material
Co-requisite: MATH 151 "Engineering Mathematics I" or MATH 171 "Analytic Geometry and Calculus". You are expected to have a working knowledge of plane geometry, trigonometry, and algebra. This course is calculus-based, so some familiarity of calculus is also assumed. As the semester progresses you will also be expected to have a working knowledge of derivatives and integrals, and be proficient in the use of vectors (addition, subtraction, dot and cross products).

Textbook: University Physics, vol. 1 (Chapters 1–20), 13th edition, by Young & Freedman, published by Pearson. There are a number of versions available (loose-leaf/bound; with/without eText access; with/without the technology update), but all that really matters is that you get volume 1 with access to (Modified) MasteringPhysics via MyLabs/Mastering. If you plan to take PHYS 208, you may as well get both volumes; but we'll only use volume 1. Your most cost-effective option is probably to get the loose-leaf version with Mastering, ISBN 9781269594868 ($105.35 new at the bookstore). Older editions are not significantly different and may be used.

Homework: MasteringPhysics will be used to submit the homework assignments on a weekly basis. If you did not buy Modified MasteringPhysics with the textbook, you may purchase it online during the registration process for $66. Note that MasteringPhysics access lasts 24 months and includes the entire text (i.e. the same account can be used for both PHYS 218 and 208). Also note that this is not (exactly) the same product as in semesters prior to Spring 2014; if you've taken this course and paid for MasteringPhysics already, please see below for information on gaining access this semester without being charged again (under the "If you've previously taken the course" heading). Pearson gives a 14-day trial period before requiring you to pay for Mastering if you didn't get access by purchasing a new book. You should register for Mastering Physics from the homework link on your eCampus
**PHYS218 course site.** After registering, you can access your homework either through your eCampus course or directly from the Mastering/MyLab website.

### Pre-lectures:
All sections will use the smartPhysics on-line lecture system. We will **not** be using their book; so don't buy it! You only need online access to their site, for which you'll need to sign up with this Course Access Key: **90de3376**. SmartPhysics is kind enough to offer a 30-day grace period for you to try it out, particularly so those of you who end up choosing to drop the course do not have to pay for it. Therefore there's no rush for you to buy access and we suggest you wait until after the first week or two of classes to purchase it. After the 30-day grace period, your most cost-effective option is to purchase it online from smartPhysics directly for $30. This handout will help guide you through the registration process: [http://physics218.physics.tamu.edu/SmartPhysicsForStudents.pdf](http://physics218.physics.tamu.edu/SmartPhysicsForStudents.pdf)

### Labs:
You do **not** need to purchase a printed lab manual as in previous semesters; instead we are adopting a new online lab manual with write-ups turned in via the WebAssign website. To enroll, sign up using your TAMU NetID login and password at our customized login page: [www.webassign.net/tamu/login.html](http://www.webassign.net/tamu/login.html). Similar to smartPhysics, WebAssign offers a two-week grace period for you to try it out before requiring you to purchase access. So we again suggest you do not rush to buy an access card; wait until you're sure you won't drop the course before spending your money. Before the end of the two-week grace period, your most cost-effective option for purchasing will be online from WebAssign directly for $36.50. This quick start guide ([http://physics218.physics.tamu.edu/WebAssign-quickstart-2015A.pdf](http://physics218.physics.tamu.edu/WebAssign-quickstart-2015A.pdf)) will help guide you through the registration process and contains useful information such as system requirements and customer support. [Note that you must complete the Lab Safety Acknowledgement form before being allowed to enter the lab rooms.]

### i>clickers:
If you don't already have one for other classes, you will need to purchase an i>clicker2 for in-class participation during the lectures. If you bought a new book, it may have come with a discount coupon for the i>clicker2. We will not be using the alphanumeric capabilities of the i>clicker2, so the older i>clicker2 model for just multiple-choice responses is completely acceptable. To register your i>clicker2, follow these simple steps: [http://physics218.physics.tamu.edu/iclicker-registra](http://physics218.physics.tamu.edu/iclicker-registration.shtml)

**If you've previously taken the course**
If you first activated your MasteringPhysics access code less than 24 months ago, you do **not** have to buy it again. However, Modified Mastering is not the same as MasteringPhysics, so you need to send information to Pearson so your access can be transferred. Specifically, send them an email with the following information:

1. your MasteringPhysics username,
2. the email you used to sign up with,
3. the semester you activated your account, and
4. how you purchased your access to MasteringPhysics (access code with a new book from the MSC bookstore, access code with a new book from somewhere else, or on-line registration).

If you took the course after we switched to using WebAssign (Fall 2013) **and** your lab grade was ≥90%, then you can transfer your lab grade without having to re-do the labs (or sign up for WebAssign again). Note that you **do** still have to attend the weekly recitations. To request your lab grade be transferred, ask for an fill out a form available at the Physics front office on the first floor of MPHY.

If you scored less than 90% on the labs or took it earlier than Fall 2013, you need to re-do the labs. WebAssign access is only valid for one semester, so you will have to get a new access code for this semester.

Access to smartPhysics is only valid for one semester, so you will have to get a new access code for this semester.

Although not "required," we **highly recommend** that you check your math skills by taking these simple quizzes: [http://physics218.physics.tamu.edu/math_prep.shtml](http://physics218.physics.tamu.edu/math_prep.shtml). If you're not prepared enough in math and don't find them simple, then you will be at an immediate disadvantage in this course; it is far too easy to fall behind in this fast-paced class, even if you’re already strong in math.
Course Evaluation

36% Midterm exams  
(12%×3) There are three common midterms on the evenings of Feb 25, Mar 25 and Apr 22.

25% Comprehensive final  
Friday May 8, 10:30 am – 12:30 pm

12% Online homework  
Submitted and graded using MP through Homework link on your PHYS218 course on eCampus.

10% Laboratory  
There are seven laboratories submitted using WebAssign as well as weekly recitation quizzes given by your TA. Recitations meet weekly for 50 minutes, and on weeks that there is one scheduled, the lab will start 10 mins after the recitation finishes. See the Department-wide Laboratory Information page for schedules by section.

8% Recitation quizzes

6% Pre-lectures and checkpoint quizzes in smartPhysics -- to assess how well you grasped the core physics concepts.

3% i>clickers  
a personal response system used for in-class participation and/or quizzes.

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100% Total

Grade curving:  
Final grades may be curved at the end of the semester depending on the conditions of the exams. In no case will a curve result in a lower letter grade than the standard 90-100% A, 80-89% B, 70-79% C, 60-69% D, and <60% F.

Absences:  
Only in the case of officially excused absences will a student be allowed to remedy a missed exam, laboratory or recitation quiz. In particular, the "Explanatory Statement for Absence from Class form" is not sufficient; confirmation of a visit to a health care professional or equivalent affirming the date and time of the visit is required. If at all possible, the student should either inform me prior to missing a midterm exam, or inform their TA prior to missing a lab/recitation. Students are required to notify me and/or their TA by the end of the second working day after their absence, and documented proof must be presented within one week of the last date of the absence. Otherwise, the student will receive a zero for the missed exam, lab and/or recitation quiz.

Note: Very few conditions qualify as an authorized excused absence, so please avoid missing an exams and labs at all costs.

There will be no make-up examinations for missed exams in this course. Students who miss an exam due to a valid and accepted absence will have the weighting of their other exams raised to compensate the missed exam.

Resources available to you

Office hours:  
Hopefully all of you feel comfortable taking advantage of your professor's office hours if you have any questions.

Supplemental Instruction:  
The University provides free Supplemental Instruction led by a student who recently completed (and did well in!) PHYS 218. The SI leader this term for all sections is Tasnim Mohamed. She will host three sessions per week in Blocker 163: Tues, Weds and Thurs, 8:00–9:00 pm. There is even a Facebook page you can check out for the latest updates. The first session will be Tues Jan 27.

Recitations:  
Your T.A. should be an invaluable resource for you! Go to recitations armed with questions (just like you should come to the lectures!) and get the T.A. to help clear up any misconceptions or difficulties you may have. Another person explaining another way may resonate better with you; this is, after all, the whole point of the recitations.

The Help Desk:  
The Physics Help Desk is located in MPHY 135. Starting the second week of the term, it is open from 9am to 4pm Mon through Thurs, and 9am to noon on Fridays. The Help Desk is staffed by physics graduate students knowledgeable in mechanics who can help if you are stuck solving the homework or on a particular concept. No appointment is necessary. Honestly, I have heard mixed reviews on the usefulness of the Help Desk, but if you need help it is another free resource available to you.

eCampus:  
Texas A&M's centralized learning management system, powered by Blackboard Learn.

Academic Integrity Statement

### Americans with Disabilities Act (ADA) Policy Statement

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call (979) 845-1637. For more information visit [http://disability.tamu.edu](http://disability.tamu.edu). All information and documentation concerning a disability is kept confidential.

For your convenience, here's a copy of the Weekly class schedule:

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Lecture topic</th>
<th>Sections in text</th>
<th>Laboratory</th>
<th>Recitation topic</th>
<th>Recitation quiz?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Jan 19–23</td>
<td>Introduction; vectors</td>
<td>Chp 1: §1–10</td>
<td>No lab (MLK holiday)</td>
<td>Introduction and math review</td>
<td>no</td>
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<td></td>
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<td><strong>5:00 pm Mon Jan 26</strong> Last day to add/drop a course</td>
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<td>2.</td>
<td>Jan 26–30</td>
<td>Motion along a straight line</td>
<td>Chp 2: §1–6</td>
<td>Diagnostic evaluation</td>
<td>Math review*</td>
<td>yes*</td>
</tr>
<tr>
<td>3.</td>
<td>Feb 2–6</td>
<td>Motion in 2 and 3 dimensions</td>
<td>Chp 3: §1–5</td>
<td>Expt #1: Measurements</td>
<td>Kinematics</td>
<td>yes</td>
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<tr>
<td>5.</td>
<td>Feb 16–20</td>
<td>Further application of Newton's laws</td>
<td>Chp 5: §1–4</td>
<td>Expt #3: Motion with constant acceleration</td>
<td>Newton's laws</td>
<td>yes</td>
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<td></td>
<td><strong>Weds Feb 25</strong> EXAM I Chapters 1–4</td>
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<tr>
<td>6.</td>
<td>Feb 23–27</td>
<td>Work, kinetic energy and the work-energy theorem</td>
<td>Chp 6: §1–4</td>
<td>No lab</td>
<td>Newton's laws</td>
<td>yes</td>
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<tr>
<td>7.</td>
<td>Mar 2–6</td>
<td>Conservative forces, energy and conservation of energy</td>
<td>Chp 7: §1–5</td>
<td>Expt #4: Air resistance</td>
<td>Work and energy</td>
<td>yes</td>
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<td>8.</td>
<td>Mar 9–13</td>
<td>Centre of mass, (conservation of) momentum and collisions</td>
<td>Chp 8: §1–5</td>
<td>Expt #7: Elastic collisions</td>
<td>Conservation of energy</td>
<td>yes</td>
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<td><strong>Mar 16–20</strong> Spring Break</td>
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<td><strong>Weds Mar 25</strong> EXAM II Chapters 5–8</td>
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<td>9.</td>
<td>Mar 23–27</td>
<td>Rotation of rigid bodies; moments of inertia</td>
<td>Chp 9: §1–5</td>
<td>No lab / Expt #6: Rotational kinematics*</td>
<td>Momentum</td>
<td>yes</td>
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<td>10.</td>
<td>Mar 30–Apr 3</td>
<td>Torque, rotational dynamics and conservation of angular momentum</td>
<td>Chp 10: §1–7</td>
<td>Expt #6: Rotational kinematics / No lab*</td>
<td>Rotational dynamics</td>
<td>yes</td>
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<tr>
<td>11.</td>
<td>Apr 6–10</td>
<td>Static equilibrium</td>
<td>Chp 11: §1–3</td>
<td>Expt #5: Torques and static equilibrium</td>
<td>Rotational dynamics</td>
<td>yes</td>
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<td><strong>5:00 pm Tues Apr 21</strong> Last day to drop a course with no penalty (&quot;Q-drop&quot;)</td>
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<td>13.</td>
<td>Apr 20–24</td>
<td>Simple harmonic motion and pendula</td>
<td>Chp 14: §1–8</td>
<td>No lab</td>
<td>Gravitation</td>
<td>yes</td>
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<td><strong>Weds Apr 22</strong> EXAM III Chapters 9–11, 13</td>
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<td>14.</td>
<td>Apr 27–May 1</td>
<td>Mechanical waves</td>
<td>Chp 15: §1–8</td>
<td>No lab***</td>
<td>Periodic motion</td>
<td>yes</td>
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<tr>
<td>15.</td>
<td>May 4</td>
<td>Review</td>
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**Make up recitation for Monday sessions**

**May 8**

**COMPREHENSIVE FINAL EXAM**

**Chapters 1–11, 13–15**