Physics 142E, General Physics I

Spring 2008

Section 1, MWF 9:00 - 9:50 AM
Blaine Norum

Section 2, MWF 10:00 - 10:50 AM
Eugene Kolomeisky

This is part one of a two-semester course sequence (142E, 241E) that is typically taken by engineering students. The course is an introduction to physics, both classical and modern. It is calculus based. Besides the physics, we will also teach you important skills that will be useful in engineering and other walks of life: including abstraction, idealization, approximation, and mathematical/conceptual modeling of simple phenomena. Each week involves attending three one-hour lectures. Associated with the course is a workshop laboratory, Physics 142W, which is a separately graded and administered course. All questions concerning the workshop laboratory should be directed to Rick Marshall.

Location: Physics Room 203

Instructors:

Blaine Norum, Room 136 Physics Building (434) 924-6789, e-mail: ben@virginia.edu.
Office hours: Monday, Wednesday 3 - 5 pm, Room 136 in the Physics Building or by appointment.

Eugene Kolomeisky, Room 322 Physics Building (434) 924-6809, e-mail: ek6n@virginia.edu.
Office hours: Monday, Wednesday 11am - 1 pm, Room 322 in the Physics Building or by appointment.

Required text:
Author: H.C. Ohanian and J.T. Markert
Title: Physics for Engineers and Scientists, Volume I
Publisher: Norton
Edition: 3

Introduction

Read this!
The aim of this course is to teach you to understand the physical world and to solve problems about that world. Both elements are important to you.

Your grade in the course will depend on your ability to solve problems. You will achieve such an ability by understanding the basic concepts and by practicing on a large variety of problems. The lectures are oriented towards helping you understand why and how we understand what we do about physics, not simply towards helping you learn how to plug in formulas in order to solve rote problems. Understanding the concepts is the best long-term way for you to be able to solve the problems that an engineer faces.

Problem solving skills are honed by doing problems. You should look at more problems than the ones assigned as homework, at least to convince yourself that you would know how to handle them. Feel free to consult with each other on how to do the problems, but don't put yourself in the position of copying answers from your partner(s). And, to validate your approach to any given problem, feel free to consult your course instructor during his office hours. But, be aware that we will NOT give explicit information on how to solve any given homework problem.

Course Structure

How your grade is determined:

- Homework: 20%
- Tests: 50% for the average of three midterms
- Exam: 30% for the final exam.

Three midterm tests

- Monday February 11, 5:00-6:30 pm and 7:00-8:30 pm
- Monday March 17, 5:00-6:30 pm and 7:00-8:30 pm
- Monday April 14, 5:00-6:30 pm and 7:00-8:30 pm

You may take either exam on a given date, but not both! To do so is an honor violation.

Note: No make-up exams are given! With a valid excuse before the exam (except in the case of family or medical emergencies), the remaining elements of the course will be appropriately averaged. Without a valid excuse before the exam, the exam grade will be a zero.

The midterm exams will be a mixture of problems (like the ones you do in the homework) and of conceptual, multiple choice questions; the
Final exams will be multiple choices.

Final exam:

- Section 1: Saturday, 3 May 1400-1700
- Section 2: Friday, 2 May 900-1200

If you have a serious conflict then, by prior arrangement with both instructors, you may take the final exam with the other section.

Workshops

The workshops (http://www.people.virginia.edu/~rmm5a/142W/Spring2008/) are labs, which will be completed in groups. All students should register for a workshop section. You must attend the first meeting on time, or your name will be dropped from that section. You must also buy the manual, which is available in the UVA bookstore. The workshops are an enjoyable way to work with your peers and increase your understanding of physics. Please note that the workshops are not formally part of this course but rather a separate entity and must be signed into or out of separately.

The first meetings of PHYS 241W will occur during the week of January 28.

Homework

Homework problems will be posted in the toolkit and will be due each week at 5 PM Wednesday afternoon. The homework problems have to be worked in full and clearly on paper, and must be returned, before the deadline, in the lockboxes located in the Physics Building ground floor (across from the vending machines). The homework should either be pledged or, if you do it in collaboration with some other student, should contain the statement "this homework was done in collaboration with xxyy". In order to create the overall homework grade, each week 2 of the assigned problems will be graded.

Getting help on the homeworks:

- Help is available during regular, posted office hours.
- The engineering school also provides tutoring assistance; consult the Dean's Office for specific hours.
Attendance at all lectures is strongly recommended. You are responsible for all assigned material, whether it is specifically presented in lecture or not. You are also responsible for knowing the problem assignments and for any announcements that may be made in lecture regarding changes in the assignments, schedule, etc.

### Lectures

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<th>Topic</th>
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<td>#1</td>
<td>Jan. 16</td>
<td>Space, Time, and Mass</td>
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<tr>
<td>#2</td>
<td>Jan. 18</td>
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<td>#3</td>
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<td>#5</td>
<td>Jan. 28</td>
<td>Vectors</td>
<td>3 (3-4)</td>
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<tr>
<td>#6</td>
<td>Jan. 30</td>
<td>Motion in Two and Three Dimensions</td>
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<tr>
<td>#7</td>
<td>Feb. 1</td>
<td>Motion in Two and Three Dimensions</td>
<td>4 (5-6)</td>
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<tr>
<td>#8</td>
<td>Feb. 4</td>
<td>Newton's Laws of Motion</td>
<td>5 (1-2)</td>
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<tr>
<td>#9</td>
<td>Feb. 6</td>
<td>Newton's Laws of Motion</td>
<td>5 (5-6)</td>
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<tr>
<td>#10</td>
<td>Feb. 8</td>
<td>Further Applications of Newton's Laws</td>
<td>6 (1-2)</td>
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<td>#11</td>
<td>Feb. 11</td>
<td>Further Applications of Newton's Laws</td>
<td>6 (3-4)</td>
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**Feb. 11 Mon. Exam 1, 17:00-18:30/19:00-20:30 Chapters 1-4**

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<tr>
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<td>#13</td>
<td>Feb. 15</td>
<td>Work and Energy</td>
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<tr>
<td>#14</td>
<td>Feb. 18</td>
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<tr>
<td>#15</td>
<td>Feb. 20</td>
<td>Conservation of Energy</td>
<td>8 (3-5)</td>
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<tr>
<td>#16</td>
<td>Feb. 22</td>
<td>Gravitation</td>
<td>9 (1-3)</td>
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<td>#17</td>
<td>Feb. 25</td>
<td>Gravitation</td>
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<td>#18</td>
<td>Feb. 27</td>
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<td>#19</td>
<td>Feb. 29</td>
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### Spring Break

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<tr>
<td>#20.</td>
<td>Mar. 10</td>
<td>Collisions</td>
<td>11 (1-2)</td>
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<td>#21.</td>
<td>Mar. 12</td>
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<td>#22.</td>
<td>Mar. 14</td>
<td>Rotation of a Rigid Body</td>
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<td>#23.</td>
<td>Mar. 17</td>
<td>Rotation of a Rigid Body</td>
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**Mar. 17 Mon. Exam 2, 17:00-18:30/19:00-20:30 Chapters 5-10**

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<tr>
<td>#24.</td>
<td>Mar. 19</td>
<td>Dynamics of a Rigid Body</td>
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<td>Mar. 21</td>
<td>Dynamics of a Rigid Body</td>
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<td>#26.</td>
<td>Mar. 24</td>
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<td>#27.</td>
<td>Mar. 26</td>
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<td>#28.</td>
<td>Mar. 28</td>
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<td>#29.</td>
<td>Mar. 31</td>
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<td>Waves</td>
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**Apr. 14 Mon. Exam 3, 17:00-18:30/19:00-20:30 Chapters 11-16**

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<td>#36.</td>
<td>Apr. 16</td>
<td>The Ideal Gas</td>
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#37. Apr. 18 Fri. The Ideal Gas 19 (3-4)
#38. Apr. 21 Mon. Heat 20 (1-3)
#39. Apr. 23 Wed. Heat 20 (4-6)
#40. Apr. 25 Fri. Thermodynamics 21 (1-2)
#41. Apr. 28 Mon. Thermodynamics 21 (3-4)

Homework assignments

All homework must be handed in **by 5:00 PM** on the date indicated either in class or in the labeled boxes in the basement. Homeworks will be returned to the labeled slots on the second floor on the Wednesday one week after they were handed in. Any homeworks remaining in the second floor slots after one week will be discarded.

Weekly assignments are posted on the Assignment section of the Toolkit class page.

Solutions to weekly assignments are posted on the Materials section of the Toolkit class page.

Links

- [HyperPhysics](#)
- [Interactive Java Tutorials](#)
- [On-line integrator](#)