

## PH2100 University Physics I - Mechanics ... (3-0-0) f, s, su ... 3 Cr

A calculus-based introduction to classical mechanics. Topics include kinematics, Newton's laws, work and energy, the universal law of gravitation, systems of particles, rotational motion, oscillations, and transverse waves.

Prerequisite: [PH1100](#); and MA1150 or MA1160

Corequisite: MA2150 or MA2160.

This course is a prerequisite for: CM3110, MA4515, MEEM2700, MG3400, [PH2200](#), [PH2200H](#), and [PH2300](#).

Course fee: \$8.50

Text (Spring & Summer, 2004)--A new text will be used beginning Fall, 2004:

- *Physics for Scientists & Engineers, 6<sup>th</sup> Ed.*, Serway and Jewett (ISBN 0-534-40842-7)

Previous Text:

- *Physics for Scientists & Engineers with Modern Physics & Student Tools CD-ROM, 5<sup>th</sup> Ed.*, Serway and Beichner (ISBN 0-03-0317169)

Course Web Page:

[Spring 2004](#)

[Spring 2003](#)

[Spring 2001](#)

[Fall 2000](#)

Previous version of the course had designation:

**PH2100 University Physics I - Mechanics ... (2-2-0) f, s, su ... 3 Cr**

Change to 3 class meetings per week effective Fall, 2004.

Other Typical Texts:

Wolfson and Pasachoff, *Physics with Modern Physics for Scientists and Engineers, 2<sup>nd</sup> ed.*

Halliday, Resnick and Walker, *Fundamentals of Physics, 5<sup>th</sup> ed.*

### Typical Course Syllabus

Topic	Number of Lectures and Recitations (combined)	Chapter in Wolfson and Pasachoff
1. Introduction - Doing Physics	2	1
2. Motion in a Straight Line	4	2
3. The Vector Description of Motion	4	3
4. Motion in More Than One Direction	4	4

5. Dynamics: Why Do Things Move	4	5
6. Using Newton's Laws	6	6
7. Work, Energy, and Power	2	7
8. Conservation of Energy	4	8
9. Gravitation	4	9
10. Systems of Particle	2	10
11. Collisions	4	11
12. Rotational Motion	4	12
13. Rotational Vectors and Angular Momentum	4	13
14. Static Equilibrium	2	14
15. Oscillatory Motion	2	15
16. Wave Motion	4	16

**Course Rationale:**

The first of four courses making up a year and a half of introductory physics using a calculus-based approach. This course introduces students to classical mechanics using mathematical skills learned during second semester calculus and with the depth that is usually found in an introductory physics course. Such a course is traditionally the first course in physics for engineering and science majors and closely resembles the previous PH204 course. This course is required for SPH and SAP majors.

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WebAssign Problems 15%

Final Exam 30%

For each of the five segments of your grade, you will be given a numerical score from 0 to 100. For an indication of your standing relative to the class, you may use the following table:

A	90-100	C	67-72
AB	85-89	CD	62-66
B	78-84	D	54-61
BC	73-77	F	0-53

Letter grades for the course will be based on the above scheme with the provision that the cutoffs are subject to change. All questions regarding the grading policy for the course should be addressed to your lecturer. Questions regarding the grading of specific quizzes should be addressed to your recitation instructor. Questions about the grading of the hour exams should be presented to your lecturer.

### **Recitation Sections**

You are expected to have worked on the assigned homework problems and discussion questions before attending recitation. Homework assignments are found on the [assignment schedule](#). Answers to the odd-numbered problems are found in the book. Answers to the assigned even numbered problems will be available from your recitation instructor. Recitation is the place that questions can be posed to and by your instructor. *It is vitally important that you attempt to solve and understand all the assignments and associated concepts.* The best way to do this is to prepare diligently for and to participate in the recitations.

The textbook publisher also maintains a web site: <http://www.pse6.com>. This site includes a lot of interesting supplemental material, including some animated demos and worked out problem solutions.

The recitation part of your grade is determined by your performance on the 7 short quizzes, which are indicated on the [assignment schedule](#). Quizzes will frequently consist of problems similar to those assigned as homework and will be graded by your recitation instructor. You will be allowed to use the [equation sheet](#) during the quiz. Be sure to bring a copy to class on quiz days. Attendance will be taken occasionally in recitation and will be used to decide borderline course grades.

### **WebAssign**

A selection of the problems on the [assignment schedule](#) are "WebAssign problems" and are to be completed before 8:00 am of the day your recitation meets. Note that there are generally two WebAssign problem sets open for you to work on at the beginning of the week. Be sure to work on the Tuesday assignment first. A [WebAssign information sheet](#) is available online, click [here](#). Be sure to watch for course announcements on the page that displays after you log on.

### **Hour Exams**

Exams will be written by the lecturers with both conceptual questions and problems. These will be similar to examples in the textbook and the assigned questions and problems from recitation. Exams will be closed book and closed notes. You may, however, use an [equation sheet](#) which will be provided with your examination.

The times set for the hour exams are as follows:

<a href="#">Exam I</a>	Tuesday, February 17, 2004	6:00 pm
<a href="#">Exam II</a>	Tuesday, March 30, 2004	6:00 pm

Since these times were published in the scheduling booklet when you enrolled in this course, it is your responsibility to appear at the scheduled times to take the exams. Any conflict should be cleared by changing the conflicting event. No late exams will be given. Unexcused absences will be graded as zero. Your recitation instructor will inform you of the location of the exam for your section.

For those taking the exam in 135 Fisher, the door will open at 5:55 p.m. and everyone should be seated in the *assigned* seat and ready to begin work by 6:00 p.m. If you are taking the exam in another room, wait outside until the proctor says it is OK to enter. Papers will be collected one hour later. An unexcused absence from an exam will be graded zero. The exams will be multiple choice with an option for you to choose two or three answers on the problems (as an opportunity for partial credit) if you are not sure which one is correct. Your answer sheets will not be returned to you. The [correct answers](#) will be posted the day after each exam.

Sample exams from prior semesters (while in a different format) are available as various file types for downloading and study at <http://www.phy.mtu.edu/~jaszczak/ph2100-exam.html> The exams given last spring are also available by clicking here: [Exam I](#), [Exam II](#), [answers for both](#). You are welcome, indeed encouraged, to use available old exams as you study. You should also study your assigned homework problems and the worked examples in the textbook. The more different kinds of problems you work, the better prepared you should be.

### **Final Exam**

The final exam will be on Wednesday, May 5, beginning at 12:30 pm. The location will be published by the University. You may ask your recitation instructor about the location of the exam for your section. The exam will be a full two hours long and will be comprehensive. The structure and grading of the final will be similar to the hour exams. The essential difference is that more answers will be required. An unexcused absence from the final exam will be graded zero.

### **Equation Sheet**

An equation sheet is available for [download](#) for you to use while working the assigned homework problems. A fresh copy of the same equation sheet will be provided for you to use on each examination. No other equation sheets will be allowed during examinations. If you need a new equation sheet, go to <http://www.phy.mtu.edu/~jaszczak/ph2100formulasheet.pdf>.

### **Extra Help**

The lecturers and the recitation instructors are available for help during their office hours and by appointment. You are especially encouraged to take advantage of instructors' office hours.

If you wish to have additional help, the [Physics Learning Center](#) is located in Fisher 228. It offers individual weekly appointments, learning teams, and a "walk in" service. The appointment schedule fills early in the semester. The "walk in" hours are posted on the door of Fisher 228 and you can get occasional help this way. Do not expect the coaches to do your homework for you. They know which problems are on the WebAssign assignment and will not work those specific problems before recitation. Do take advantage of this service- IT HELPS!

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Questions or comments? Email [gagin@mtu.edu](mailto:gagin@mtu.edu)

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# PH2100 University Physics I: Assignments Spring 2004

Textbook: *Physics for Scientists & Engineers, 6<sup>th</sup> Ed.*, Serway and Jewett (ISBN 0-534-40842-7)

WebAssign problems are indicated in **bold** numbers.

Lecture			Recitation			
Date	Chapter	Sections	Date	Chapter	Problems	Questions
Jan. 12	1	1-7	Jan. 13	1	4, 5, 7, 15, 28, 42, 52	4, 5, 9
14	2	1-5	15	2	3, 6, 7, 11, 12, 18, 19	5, 10, 11
19	Martin Luther King Day (no lecture)		20	2	<b>20, 25</b> , 32, <b>33</b> , 37	7, 8, 12
21	2	5-7	22	2	43, <b>50</b> , 55, 63, <b>69</b>	3, 16
26	3	1-4	27	3	<b>4</b> , 7, <b>22</b> , <b>28</b> , 31, 43, 58, <b>60</b> Quiz 1	4, 8
28	4	1-3	29	4	<b>5</b> , <b>11</b> , <b>13</b> , <b>14</b> , 17, 24	1, 8, 10, 13
Feb. 2	4	4-6	Feb. 3	4	<b>29</b> , 30, <b>31</b> , 33, 34, <b>40</b> , <b>41</b> , 42 Quiz 2	2, 19, 21
4	No Lecture		5	Winter Carnival Recess		
9	5	1-6	10	5	1, 6, <b>9</b> , <b>11</b> , 12, <b>15</b> , <b>21</b>	1, 2, 3, 7
11	5	7-8	12	5	<b>22</b> , 24, <b>33</b> , <b>37</b> , 44, <b>46</b> Quiz 3	23, 25
16	6	1-2	17	5	<b>54</b> , 55, <b>64</b>	16, 19
<b>Tuesday, February 17, 2004, 6:00pm -- EXAM I -- Chapters 1-5</b>						
Feb. 18	6	Examples	Feb. 19	6	1, <b>5</b> , 9, <b>10</b> , 15, <b>19</b> , 50	1, 3, 5, 9
23	7	1-4	24	7	1, <b>2</b> , 4, <b>5</b> , <b>7</b> , <b>11</b> , 15, 16	4, 7, 10, 14
25	7	5-8	26	7	<b>25</b> , 27, 31, <b>33</b> , <b>37</b> , 40	3, 12
SPRING BREAK						
March 8	8	1-3	March 9	8	<b>2</b> , 5, 7, 10, <b>17</b> , 21, <b>24</b>	3, 6, 8, 15
10	8	4-6	11	8	26, <b>30</b> , 31, <b>33</b> , 35, 45, 46, <b>57</b> , 58	1, 2, 7, 17, 23

15	9	1-4		16	9	1, 5, 7, 8, 17, 18, 21, 24, 27 Quiz 4	2, 3, 5, 6, 8, 11, 23
17	9	5-7		18	9	32, 33, 35, 37, 41, 47	17, 19, 24, 28
22	10	1-5		23	10	1, 3, 4, 5, 8, 14, 20, 21 Quiz 5	1, 2, 5
24	10	6-8		25	10	30, 31, 34, 43, 51, 55, 71	7, 11, 17, 18, 19, 24
29	10	9		30	REVIEW, attendance optional		
<b>Tuesday, March 30, 2004, 6:00pm -- EXAM II -- Chapters 6-10</b>							
March 31	11	1-3		April 1	11	3, 6, 11, 12, 22, 23, 25	1, 2, 4, 7, 8
April 5	11	4-6		6	11	28, 29, 30, 33, 36	11, 16, 18
7	12	1-2		8	12	2, 3, 5, 39, 45, 56	3, 6, 9
12	13	1-5		13	13	1, 5, 6, 9, 16, 19, 24 Quiz 6	3, 4, 12, 14, 16
14	13	6-7		15	13	25, 27, 28, 31, 40	
	15	1-2		15	15	1, 7, 9	1, 3, 4
19	15	3-4		20	15	21, 23, 25, 27, 35	10, 14
	16	1-2		20	16	1, 2, 3, 8	6, 8, 10
21	16	2-6		22	16	13, 16, 17, 23, 27, 44, 49 Quiz 7	7, 13, 14
26	17	1-4		27	17	1, 7, 27, 33, 37, 39, 40	3, 8, 11, 12
28	18	1-5, 7		29	18	1, 8, 15, 17, 19, 37, 47, 52, 59	5, 6, 7, 10, 12
<b>FINAL EXAM -- Wednesday, May 5, 2004, 12:30 pm</b> See final exam schedule for location of exam							

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Go to the PH2100 [Information Sheet](#)

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