

PHYSICS 181.F, Sections A & B - THE PHYSICAL WORLD, Fall 2011

9:05 – 9:55 (A), 10:10 – 11:00 (B), both MTRF, Rm 120 Culler

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Text: **Physics for Scientists and Engineers (with Modern Physics), 2nd Ed.** by Knight
ISBN-13: 978-0-321-51637-4 with workbook (recommended)

Grading Policy: Course grades will be based on the following categories with the indicated weights.

Three exams & the final	22.5 % each (90 % total)
“Weekly” quizzes	ungraded, self assessed (i.e. practice)
Homework	10 % (Grader: TBA)

You will be graded on a "curve" if necessary, but the following guarantees are made:

Earn at least 60% of the total possible and you will receive at least a D	
70%	C
80%	B
90%	A

If you have any questions about the grading policy, please see your instructor.

This is a **problem-solving-oriented course**. Therefore, homework, practice quizzes and exams will be heavily weighted towards **developing problem solving skills**. Homework will be assigned from the Exercises/Problems sections at the end of each chapter or supplied via class handout. The Student Workbook that accompanied your text may also be used for homework source material. Quizzes will either be taken from the relevant Problems sections or will be developed by the instructor. Exams will consist of short answer questions and problems similar in nature to those assigned as homework or given as practice quizzes. Exam problems may be drawn from those found in your text. The big hint here is that you should work as many of the problems in your text as possible. Group study is encouraged. **Exams will be given on Tuesday evenings, 8 – 10 PM.... ?? (see pseudoschedule).**

- Homework must be turned in at the **beginning** of class on Tuesday of each week.

- No make-up exams without an excellent excuse.

The subjects that we'll study this semester are classical mechanics through oscillations (Knight C1-14), wave kinematics & physical optics (Knight C20-22, 25), and quantum mechanics (Knight C38-41), with class discussion informing each.

The laboratory (PHY 183) is a separate course. If your home Department requires it, you should be enrolled in a section of the laboratory, and you should obtain a lab manual from one of the bookstores.

Final Exams: **Friday, December 16, 8:00 – 10:00 (Section A) – NOT MY FAULT!**
Wednesday, December 14, 10:15 – 12:15 (Section B) - Be there!

Relation to the **Miami Plan**

PHY 181 is designed to meet the goals of the Miami Plan Foundation (MPF). Goals are:

1. **Critical Thinking**

You will be presented with many different situations from the physical world. You will need to consider which laws and models may be used to analyze a given situation. You will then need to carry out both qualitative and quantitative analyses to determine what is happening now and make predictions of what will happen in the future. Throughout this entire process, you will need to think about what assumptions need to be made and what the limitations any model may be. Critical thinking skills are central.

2. **Interacting with Other Learners**

You will work in groups to solve assigned homework problems. It has been shown repeatedly that students can learn effectively from one another, and that **all** group members benefit from the group interaction. The associated laboratory course (PHY 183) will involve further interaction.

3. **Understanding Contexts**

Throughout this course it will be stressed that physical “laws” are not absolute truth, but rather approximations that adequately describe a body of knowledge for a limited time. It is crucial to understand the assumptions and restrictions of any physical model, and you must consider these points when analyzing any system. That our understanding of nature changes with time is also stressed in this course. For example, after studying Newtonian mechanics we will examine quantum physics. For the latter, the laws that work very well on our everyday scales of length and time are shown to fail on the scales of the very small (“atomic level”).

4. **Reflecting and Acting**

It should be clear that you will need to do much thinking when analyzing physical phenomena. You cannot start writing down equations without first thinking about the particular situation and what physical principles are relevant. You will not do well in this course by approaching it from a “memorize & regurgitate” point of view!

Pseudoschedule
(exam dates are fixed - rate of discussion of topics may vary)

Week	Topic	Knight
8/22	I. Classical Mechanics and Waves - Introduction.	1, 2, 3
8/29	1-D Motion. Mr. Newton's Laws	3, 4, 5
9/5	2-D Motion, Newtonian Gravity (C13) (9/5 is Labor Day)	5, 6, 7, 8
9/12	More Kinematics and Dynamics (Note: 9/12 last day to drop without grade, credit/no credit deadline)	more later
9/19	<u>Exam 1</u> - Tuesday 9/20, 8 - 10 PM Work and Energy	
9/26	Kinetic and Potential Energy & <u>CONE</u> .	
10/3	Conservation of Linear Momentum (<u>CONP</u>), Rotational Motion	
10/10	Conservation of Angular Momentum (<u>CONL</u>) (Fall Break, 10/14 – 16) (Note: midterm grades submitted this 10/3 – 10/11)	
10/17	<u>Exam 2</u> - Tuesday 10/18, 8 – 10 PM Oscillatory Motion, Damping and Resonance	
10/24	Wave Characteristics, Superposition of Waves. (Note: Fri, 10/28 last day to drop without grade of “W”)	
10/31	Synthesis and Analysis of Waves. Interference & Standing Waves.	
11/7	Single Slit Diffraction and Uncertainty. Wave Eq.	
11/14	<u>Exam 3</u> - Tuesday 11/15, 8 - -10 PM II. Quantum Mechanics Wave/Particle Duality, Quantization & Spectra.	
11/21	Quantization & Spectra. (Thanksgiving Break, 11/23-27)	
11/28	Probability. Uncertainty Principle.	
12/5	Particle Wave Functions & Mr. Schrodinger’s Equation.	
12/12	<u>Final Exam</u> - Friday, December 16, 8:00 – 10:00 (Section A) – NOT MY FAULT! Wednesday, December 14, 10:15 – 12:15 (Section B) - Be there!	
12/19 & thereafter....	Go forth and multiply, do calculus, solve differential equations, etc..	

Tentative homework assignment list from Knight (order to be specified & right is reserved to modify as deemed necessary – i.e. come to class!!):

Chapter 1: 2,6,10,12,17,24,37,43,46,52

2: 2,6,10,16,19,21,29,42,47,52,68

3: 1,5,7,10,15,17,20,26,43,44,45,46

4: 11,12,13,46

5: 1,8,18,27,32

6: 1,3,8,38,42,

7: Newton's 3rd law (of course)

8: 16

11: 1,5,14,24,30,41,43,50,56

10: 10,22,29,30,42,68,71,

13: A,B,14,32

9: 10,14,19,23,57,59,61, handout (5 problems)

12: 1,6,15,22,32,38,40,90,95

14: 3,5,8,14,20,37,65

20: 12,18,20,31,36,41,51,52,66

21: 4,6,8,10,13,47

22: 2,8,15

25: 1,2,19,31

39: 2,3,9,14,24,27,43,48,49,61,63

41: 15,20,25,26