Contact Information

Instructor:	Jim Crumley
Office:	107 Peter Engel Science Center
Email:	jcrumley@csbsju.edu
Phone:	363–3183
Office Hour:	1 pm days MWF (or by appointment or just stop by)

Course Information

Class time:	10:20
Room:	167 Peter Engel Science Center
Textbook:	*University Physics* by Young and Freedman, Thirteenth Edition
Web Site:	http://www.physics.csbsju.edu/~jcrumley/191/
	https://moodle.csbsju.edu/course/view.php?id=1074

Introduction

Physics is the most basic of sciences. It is the study of the natural world at its fundamental levels. A working knowledge of physics is needed for physicists and engineers, but it is also useful for other scientists and for people who just want to better understand the world.

In this course I have two overall goals for what I would like you to learn. You should gain

1. a working knowledge of basic physical concepts and

2. the skills needed to solve physics problems using those concepts.

Though I have separated concepts and problem solving out as distinct goals, in practice they are intertwined. You cannot solve problems unless you understand the concepts, and you do not truly understand the concepts if you cannot apply them to problems.

In this course, the concepts and topics that we will be studying are the bedrock of physics — motion, forces, and energy. The next course — Physics 200 — concerns electricity, magnetism, and circuits.

Math and Physics Background

A strong math background is needed for Physics 191 since it is a calculus-based physics course. In practice this means that the book and I will use a fair amount of calculus in deriving equations. You also need to use some calculus in solving problems. I realize that many of you are taking your first calculus course concurrently with this course, and I will take that into account when assigning problems. Note that your algebra and trigonometry skills will be more important to your success in this class than your calculus skills.

Students come into this course with a wide range of backgrounds in physics. Some of you will have had no formal physics courses previously, while others will have taken other challenging physics classes. You should know that while it is quite common to succeed in this course with no previous physics background, your previous physics experience should influence how you approach this class. On average, those with shallower backgrounds in physics will have to work harder in this course, especially at the beginning. I hope that you learn a great deal from this course and that this course challenges all of you.

Lab Information

Labs are held in rooms PE 102 and 106 on Wednesdays and Thursdays. (You will only have to attend your assigned lab period once a week). In lab you will have either Dr. Dean Langley or Dr. Adam Whitten as an instructor, as well as a teaching assistant (a physics major). For lab you need

to have the lab manual, which will be passed out during lecture, and two lab notebooks, which can be purchased at the SJU bookstore.

Before each lab make sure that you read the write-up for the lab and do the pre-lab exercises that are mentioned. If for any reason you need to miss a lab, contact Lynn Schultz, the physics department lab manager (lschultz@csbsju.edu), **before** the lab to schedule a makeup time. Lab is a vital part of this course, and you **cannot pass** this course without completing all of the assigned labs.

Class time

In class, we will be using a variety of activities. I will start most classes with 5 or 10 minutes for questions from the homework.

Next, we will cover new material. I will spend much of this time lecturing and solving problems at the chalkboard. Other activities that will be mixed in include demonstrations, group problems, and quick quizzes. For each quick quiz I will give a short problem and about five minutes to work it out on a small sheet of paper. I will collect these and grade them typically only based on whether or not you attempted the problem.

Listed below is a tentative schedule. Use the schedule as a rough guideline of what will happen in class on a given day, but be aware that we will almost certainly fall behind schedule at times, and we may even get ahead of it once or twice. You are responsible for attending class, or if you miss class finding out from your classmates what you missed. If any changes are needed in the test schedule, I will give advanced notice.

Group Problems

In order to give you experience on working on more complicated problems, you will be working in groups of three or four on some problems in class. You will get a chance to work on practice group problems in class, and then as part of each test you will also have a group problem to work on. After each test I will assign new groups.

Homework Problems

Assigned homework problems for each chapter of the book are included in the table below. Occasionally I may assign extra problems that are not from the book. The problems from each chapter will be due the class day after we have finished covering that chapter in class (e.g. — the problems from Chapter 1 are scheduled to be due September 2). You should consider the assigned problems a minimal set of problems to solve. If you are having difficulty with the material, then you should do **more** problems. Being able to solve problems is necessary in order to be successful on the tests.

The answers for some of the problems are given at the end of the chapter, and some are not. This mix of problems is intentional. Learning to check your own work is an important skill, and after you leave school you won't always have "right" answers to check against.

Solving physics problems can be difficult, so I encourage you to work in groups on problems, and get help from the TAs and myself when you need it. I will give you a list of office hours for TAs who are available for tutoring after the TAs schedules are finalized.

When working in groups, each group member must write their own solutions and must understand the solutions they hand in. Simply copying solutions that you get from another student, or that you find online, is plagiarism.

Problem sets will be graded by a grader and/or by me. Please be organized and neat, so that we can understand your solution. Please label your problems clearly, show your work, and leave space between your problems. If you have more than one sheet of paper, staple the sheets together. If you rip your paper out of a notebook, please cut off the hanging chads. Unless you are **infallible**,

please use pencil and erase completely when necessary. Points may be taken off for failing to follow these guidelines.

Homework must be turned in by 4 pm to my office on its due date, unless I announce otherwise in class. Late homework will not be accepted, though you will be able to drop your lowest score from the semester. You can also a second dropped assignment by coming to see me in my office at least once this semester. Homework solutions will be posted on the course Moodle site after the due date.

Tests

The tests will have two parts: an individual portion and a group portion. The individual portion of the tests will consist of short answer questions and problems. The group portion of the tests will consist of a more difficult problem that you will solve as a group and hand in one solution. The group test will take place on the class period before the regular test. The group test will count as 25% of the test grade. The final exam will be solely an individual effort.

All of the tests will be closed book and closed notes. You will be given a sheet with all of the equations and constants that you need for the test, though you will have to remember how to apply them. You will get a practice test roughly a week before the individual test.

I will attempt to grade the tests promptly. We will go over the tests in class after I am done grading them and I will post solutions on the bulletin board outside my office. Please do not remove the solutions from the board, make copies of them, or post them online.

Grading

The grades in this class will be based on 8 items: 4 tests, the final exam, lab, homework, and quiz/participation. Each of the 4 tests will be worth 10% of the overall grade, while the final exam will be worth 20%, lab and homework will be worth 15% each and quiz/participation will be worth 10%. The participation grade will be based on participation in the practice group tests, quizzes, and other exercises in class.

Grades in this class will be scaled based on the overall class average at the end of the course. After each test, I will give you a rough grade scale to give you an idea of how you did on that test. Those grades are for informational purposes; it is only the end of course grade scale which really matters.

Plagiarism

Plagiarism will not be tolerated in any part of this course — on tests, on homework, or on lab work. Cases of plagiarism will be dealt with following the schools' plagiarism policy.

Special accommodations

If you need special accommodations for class, please let me know in advance.

Problem List

In the schedule below, homework problems are listed for most class days. The problems listed are from the "EXERCISES" and "PROBLEMS" sections at the end of each chapter. In the book the problems are listed in the form "3.45", where the first number is the chapter, and the second number is the problem number. In the schedule below only the problem number is listed, with the chapter being whatever chapter we are covering that day. On days when we cover more than one chapter, a semicolon separates the problems for the first chapter from the the problems for the second chapter.

Course Schedule

	Date	Sections	Topics	Tests	Homework	Lab (WR)
M	8/26	1.1–4	Introduction & Units		4, 9	
W	8/28	1.5–1.9	Vectors		15, 20, 21, 26, 38,43, 57	No lab
F	8/30	1.10; 2.1–2	Vectors & Displacement		46, 52, 82; 2, 10	
M	9/02	2.3-5	Kinematics		13, 21, 27, 33, 35, 44	
W	9/04	2.6	Integration	Practice Group	54, 63, 82, 90	Data Analysis
F	9/06	3.1–3.3	Projectile motion		2, 9, 14, 20, 48	
M	9/09	3.4–5	Circular Motion		25, 30, 35, 40, 52, 62, 84	
W	9/11			Practice Group		Free Fall
F	9/13	1–3	Kinematics	Group Test		
M	9/16	1–3	Kinematics	Individual Test		
W	9/18	4.1–3	Force		5,8, 13, 37	Reaction Time
F	9/20	4.4–5	Newton's Laws		20, 24, 25,	
M	9/23	4.6,5.1–5.2	Applying Newton's Laws		30, 39, 48, 55; 7, 15, 21	
W	9/25	5.3	Friction	Practice Group	28, 30, 40	Projectile Motion
F	9/27	5.4–5	Circular Motion		47, 51, 62;	
M	9/30	6.1–2	Work & Kinetic Energy		6, 22, 28,33	
W	10/02	6.3–4	Power		38, 51, 56, 75, 78, 101	Atwood's Machine
F	10/04		Practice group			
			Long Weekend			
W	10/09	4–6	Forces & Energy	Group Test 2		Kinetic Friction
F	10/11	4–6	Forces & Energy	Test 2		
M	10/14	7.1–3	Potential Energy		7, 23, 31, 37	
W	10/16	7.4–5	Force and PE		37, 38, 48, 56, 72, 79	Flud Drag
F	10/18	8.1–3	Momentum		3, 12, 20, 37, 44, 69	
M	10/21	Collisions	8.4–5		49, 53, 58, 71	
W	10/23	8.6	Rockets	Practice Group	64, 86	Two Body Collision
F	10/25	9.1–9.2	Rotational Kinematics		4, 15, 63	
M	10/28	9.3–4	Rotational Energy		20, 25, 36, 46	
W	10/30	9.5–6	Moment of inertia		76, 87, 92	Ballistics Pendulum
F	11/01			Practice Group		
M	11/04	7–9	En., Mom., & Rot.	Group Test 3		
W	11/06	7–9	En., Mom., & Rot.	Test 3		Rotational Dynamics
F	11/08	10.1–3	Torque		3, 11, 25, 78	
M	11/11	10.4–10.6	Angular Momentum		34, 38, 47, 67, 82, 95	
W	11/13	10.7, 11.1–2	Equilibrium		56; 2, 5, 16, 19	Rotational Collision
F	11/15	11.3–5	Elasticity		31, 37, 41, 61, 63, 76	
M	11/18	13.1	Gravitation	Practice Group	6	
W	11/20	13.2–4	Gravitational PE		15, 16, 20, 49, 60	No lab
F	11/22	13.5–13.7	Kepler's Laws		28, 31, 34, 44, 56	
M	11/25	13.8	Black Holes	Practice Group	36	
			Thanksgiving Break			

	Date	Sections	Topics	Tests	Homework	Lab (WR)
M	12/02	10,11,13	Torque & Gravity	Group Test 4		
W	12/04	10,11,13	Torque & Gravity	Test 4		Lab Practical
F	12/06	14.1-3	Oscillations		4, 14, 19, 32, 72	
M	12/09	14.4-5	Pendulum		42, 45, 91	
W	12/11	14,6-8	Damped Oscillations		61, 63, 79	No lab
F	12/13	1–11, 13–14	Review			Assessment Test
M	12/16		Study Day			
T	12/17	1-3pm	1–11, 13–14	Final Exam		