DEPARTMENT OF PHYSICS
Physics 2A – General Physics – Mechanics
Summer Session I 2015

Instructor: Leandra Boucheron
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Office: Mayer Hall Addition 3631
Office Hours: M 9-10AM, T 12:30PM-2:30PM, F 11AM-1PM, by appointment

Email Policy: I will typically respond to emails within a few hours, but do not *guarantee* a response for 24 hours. You will have plenty of opportunities to ask for help in lecture, problem sessions, discussions, office hours with the TA or instructor, and in the physics tutorial center (Mayer Hall Addition 2702). Do not save all your questions until the night before a test, send me an email, and expect an immediate response. If you need to make alternate arrangements or set up an appointment for office hours, please do so at least 24 hours in advance.

Teaching Assistant: Alex Meill
Email: ameill@ucsd.edu
Office Hours:

Course Website: ted.ucsd.edu – log in with your tritonlink name and password. If you do not have a TED account, you will need to go to Academic Computing and Media Services (ACMS) in AP&M to request one.

Course Description: A calculus-based science-engineering general physics course covering vectors, motion in one and two dimensions, Newton's first and second laws, work and energy, conservation of energy, linear momentum, collisions, rotational kinematics, rotational dynamics, equilibrium of rigid bodies, oscillations, gravitation. THIS SUMMER SESSION WILL COVER THIS MATERIAL IN HALF THE TIME (5 WEEKS) OF A REGULAR SESSION. If you are not prepared for this accelerated workload, please consider taking it during the regular academic year.

Co- or Prerequisite: Math 20B

Textbook: Young & Freedman, University Physics, 14th Edition, Volume 1, Pearson

Course Schedule:

Lectures:	MTWR	11:00AM-12:20PM	Pepper Canyon Hall 122
Discussions:	W	9:00-10:50AM	Center Hall 105
Problem Sessions:	W	2:00-3:50PM	Warren Lecture Hall 2207
Quizzes:	During Lectures (7/9, 7/16, 7/23)		
Final Exam:	Friday, 7/31/2015, 11:30AM-2:30PM		Location TBA

Important Dates:	Deadline to add course	M, 7/6
	Deadline to drop course without a "W" on transcript	F, 7/10
	Deadline to drop course with a "W" on transcript	T, 7/28

Grading Policy:	Quizzes	40%	(Lowest quiz score is dropped)
	Final Exam	30%	
	Homework	15%	
	Reflection Paragraphs	10%	
	Clicker Questions	5%	
	Reading Quizzes	5%	

The astute student may notice that these values add up to 105%. This is by design – there is 5% built-in extra credit in the course.

Lectures: I will post pdf copies of the lectures on TED before class. You are adults paying for your education. You have the right to stay home and sleep through class, and the responsibility to be held accountable for it. Attendance is not mandatory, but that does not mean you are not responsible for knowing everything covered in class. If you miss class, it is not my job to repeat the material to you at your convenience. Download course materials online and/or speak with other class members to find out what you missed.

Quizzes: Quizzes will be given during lecture on 7/9, 7/16, and 7/23. You must purchase your own scantron forms for these quizzes (No. X101864-PAR). These are available in the bookstore for a nominal amount of money. I will NOT have spares. You will also need a No. 2 pencil. I will provide blank paper for the free response questions. Quizzes will be allotted 80 minutes. You will not be granted extended time if you show up to class late. **THERE WILL BE NO MAKE UP QUIZZES.** I know that there are unforeseen circumstances; as such, your lowest quiz grade for the course will be dropped. The remaining two quizzes will each be worth 20% of your grade. Calculators will be allowed. You are responsible for bringing your own calculator and having it in working order on the day of the quiz. Cell phones (or computers or any other network-connected or communication-capable devices) are not acceptable substitutes for a calculator, and you will not be allowed to have them out.

Final Exam: The final exam will be comprehensive. You will need your own scantron form and No. 2 pencil (see section on Quizzes above). The exam will be designed to take 2 hours to complete, and you will have the full 3 hour session to complete the final. Calculators are allowed on the final exam, see calculator policy in the quiz section above.

Homework: You will be assigned several written homework assignments throughout the course. Due dates will be announced in class and on the website. Homework is due AT THE START OF CLASS on the due date. Late homework (including that turned in at the end of class) will automatically lose 20% credit. You are highly encouraged to work through problems and help each other on homework outside of class, but you are NOT allowed to copy an entire problem or assignment from someone else.

Reflection Paragraphs: Reflection paragraphs need to be submitted through the TED website every Monday beginning the second week of class, by 10:00AM (note that this is an hour before class time). Late submissions will be deducted 20%. The due dates are 7/6, 7/13, 7/20, and 7/27. The purpose of these assignments is for you to critically analyze how the physics you are learning appears in the world around you. Mechanics is a part of our everyday life. The goal of this class is to get you to recognize it in its various forms and provide an interpretation in terms of forces, energy, momentum, and other physical quantities. For each reflection paragraph, think of one or more examples of the concepts we learned in class the preceding week and how they apply in your everyday life (Can you see it in nature? Is it used in various technologies? What intuition do you already have about the subject material, and why is that intuition correct or incorrect?). Explain how you can use physical concepts to explain the behavior of these phenomena. Include numbers or formulas if applicable, but more importantly, describe them and explain them. What aspects are you still confused by? These paragraphs should be around 300 words typed (half a page single spaced). They will be graded on completion and whether or not they address the questions, not on accuracy. I would rather you write more details and get a few things wrong than to write only the basics and have it completely correct. Mechanics *never* behaves EXACTLY as we teach it! That's because we can teach only the *best case* or *ideal* scenario. Part of your job as a young and budding scientist or engineer is to learn to recognize when it is or is not valid to use these types of assumptions. When in doubt, *think* about the situation. Ideas are more powerful than numbers! I will provide one or more sample paragraphs by the end of the first week as a model.

Reading Quizzes: I cannot adequately prepare for my job of teaching you the material if you do not prepare for your job of learning it by first reading through the material and considering it BEFORE class. For each day marked on the tentative schedule with an asterisk (*), you will need to read the textbook sections for the following lectures (see page 5 of this syllabus) and complete a brief reading quiz over this material on TED, due by 10:00AM on the day of class. You will be given three attempts on each multiple choice question so that you can figure out the correct answer. Short answer questions will receive full credit for any typed response. The expectation is that everyone *should* be able to earn full credit, but NO LATE SUBMISSIONS WILL BE GIVEN ANY CREDIT.

Clicker Questions: An important aspect of this class is peer instruction. Numerous studies have shown that you, the student, are able to learn many things better from your peers (the people around you) than from the person at the front of the class. This is because the person at the front of the class is viewed as an "expert" who has their own, experienced way of solving problems. You as students, are still learning how to solve those problems, and are better at communicating those steps to each other at a fundamental level. I encourage you to work through problems and help each other on homework outside of class. To facilitate this process, during each class, you will be asked to answer a number of questions with clickers. For the first attempt on these problems, you will select an answer by yourself. Next, you will discuss the answer with your neighbors. Instead of "The correct answer is C" or "I don't know how to do this problem," you should say "I chose C because …" or "I don't understand what it means by …" That way, you can be involved in the learning process and correct or learn from your classmates in real time. I will then poll the class again with the clickers, to see if any confusion has been

cleared up, and to modify the way I teach the material in real time. You alone are responsible for purchasing or renting a clicker, registering it to work with this course on TED, bringing it every day, and maintaining it in working condition (extra batteries?). Most clicker questions will be worth up to 3 points. You will be granted 2 points for providing an answer, and an additional 1 point for providing the correct answer. Thus, you have incentive to *try every question* but also to *try to get it correct*. I will make it clear when the clicker question is only worth 2 points for participation (feedback or opinion-based polls). Please note that it is a violation of UCSD's academic integrity policies to bring your friend's clicker to class and answer questions for him/her. You will not be able to make up lost points for clicker questions if you are late to, or do not attend class.

Expected Learning Outcomes: By the end of this course, you should be able to:

- Mathematically describe motion in 1, 2, and 3 dimensions.
- Conceptually explain the motion of any physical object and why it behaves that way.
- Interpret, in words, what a mathematical formula can tell you about a system's behavior.
- Determine how much, and what types, of information need to be known about a physical system in order to predict its behavior.
- Predict the motion of a physical system given its initial conditions and any external inputs (forces, energy, etc.).
- Select an appropriate method (force, energy, momentum) to solve a problem in a given physical system.
- Familiarize yourself with SI units and be able to think in terms of meters and kilograms.
- Know when a physical quantity is of a reasonable order of magnitude given real-life constraints.
- Recognize applications of mechanics in our everyday lives, be it in nature or technology.
- Discuss the extent to which physical systems differ from our ideal models.

Classroom Etiquette: Please be respectful of both the instructor and your fellow students. Avoid causing any distractions that could disrupt the ability of another student to pay attention and learn in class. All electronic devices should be muted or silenced. Please leave the classroom if you need to make or receive a phone call.

Students with Disabilities: Students requesting accommodations for this course due to a disability must provide a current Authorization for Accommodation (AFA) letter issued by the Office for Students with Disabilities (OSD) which is located in University Center 202. Students are required to present their AFA letters to the instructor and to the OSD Liaison in the department in advance so that accommodations may be arranged.

Academic Integrity: Please refer to the section on "Students' Responsibility" in the UCSD Policy on Integrity of Scholarship (http://senate.ucsd.edu/manual/appendices/appendix2.pdf)

TENTATIVE COURSE SCHEDULE

(* by the date means reading quiz due, ___ by the date means reflection paragraph due)

Date		Topics	Readings	Lecture #
6/29	M	Introduction to course, etc.	n/a	0
		Units, Sig Figs, Conversions	1.1-1.6	1
*6/30	T	Motion in 1-Dimension	2.1-2.6	2
*7/1	W	Vectors	1.7-1.10	3
		Motion in 2-Dimensions	3.1-3.3	4A
*7/2	R	Motion in 2-Dimensions, cont.	3.4-3.5	4B
		Laws of Motion	4.1-4.4	5A
*7/6	M	Newton's Third Law	11.1, 4.5-4.6	5B
*7/7	T	Applying Newton's Laws	5.1-5.5	6A
*7/8	W	More on Forces and Circular Motion	none	6B
7/9	R	**Quiz #1 (Material in RED)**	n/a	n/a
*7/13	M	Work and Energy	6.1-6.4	7
*7/14	T	Conservation of Energy	7.1-7.5	8
*7/15	W	Linear Momentum	8.1-8.6	9A
7/16	R	**Quiz #2 (Material in BLUE)**	n/a	n/a
*7/20	M	More on Linear Momentum	n/a	9B
		Rotation	9.1-9.4	10A
*7/21	T	Moment of Inertia	9.5-9.6	10B
		Torque	10.1-10.4	11A
*7/22	W	Angular Momentum	10.5-10.7	11B
		Equilibrium	11.1-11.3	12A
7/23	R	**Quiz #3 (Material in GREEN)**	n/a	n/a
*7/27	M	Elasticity	11.4-11.5	12B
		Gravitation	13.1-13.4	13A
*7/28	T	Kepler's Laws	13.5-13.6	13B
		Oscillations	14.1-14.3	14A
*7/29	W	Oscillations, cont.	14.4-14.8	14B
		Review	n/a	15
7/30	R	Student-Selected Topic A	n/a	16A
		Student-Selected Topic B	n/a	16B
7/31	F	**Final Exam (COVERS ALL MATERIAL, FOCUS ON PURPLE)**		