Torah High School of San Diego
AP Physics C: Mechanics, Fall 2020

Instructor: Brian Shotwell, bshotwell@physics.ucsd.edu

Course Webpage: Any files you might need (including HW assignments) will be located here: https://bshotwell.physics.ucsd.edu/APPhysicsC

Course Schedule: MW 1:10-2:45pm in Zoom 621 364 278 (if we need it).

Textbook: There is one required textbook for this course: *Physics for Scientists and Engineers, A Strategic Approach, 4th Edition* by Randall D. Knight. On the course schedule are sections that we will go over each day. You are to ***read these sections before class.*** Each day, we will have each student sum up what the main point of each section was.

Student Learning Outcomes: after AP Physics C: Mechanics, students will be able to:

- Describe *how* things move, both with equations and in graphs (position, velocity, acceleration).
- Describe *why* things move with Newton's laws, being able to draw a FBD (free-body diagram) that shows all distinct forces acting on an object.
- Use conservation of energy and momentum in problems.
- Apply the laws of kinematics and dynamics to rotational phenomena (giving proper definitions of the new rotational quantities), including Newton's law of gravity.
- Identify situations of simple harmonic motion, and know what variables will affect the motion.

Grading Policy: Your grade will be determined according to the following:

- 60% Problem Sets and Corrections.
- 25% Exams (oral and written).
- 15% Participation in class / class conduct.

HW Corrections: Homework will come in two stages: first, a ***DRAFT*** of your homework will be due right before class on Monday. Soon after this due date, I will post solutions to the homework, and you will have to "grade" your own problem sets. A version of your homework with ***CORRECTIONS*** will be due on Wednesday. I will explain more about this on the first day. You must turn in both a draft as well as a corrected version of your homework assignments to receive credit.

Course Schedule, page 1 of 3 (tentative; subject to change):

Week / Date	Topics	Sections in Knight textbook
WEEK 2		
Monday, September 7	**NO SCHOOL – LABOR DAY**	---
Wednesday, September 9	Introduction, Motion Diagrams, Velocity	1.1-1.4
WEEK 3		
Monday, September 14	Acceleration, Units/Dimensions, Significant Figures	1.5-1.8
Wednesday, September 16	Position and Velocity vs. Time Graphs, Calculus in Physics	2.1-2.3
	1D Kinematics with Constant Acceleration; Free-fall (acceleration due to gravity)	2.4-2.5
WEEK 4		
Monday, September 21	**NO SCHOOL – TZOM GEDALIAH**	---
Wednesday, September 23	Motion on an Inclined Plane, Instantaneous Acceleration, Review	2.6-2.7
WEEK 5		
Monday, September 28	**NO SCHOOL – YOM KIPPUR**	---
Wednesday, September 30	Vectors and Coordinate Systems, Unit Vectors	3.1-3.4
WEEK 6		
Monday, October 5	**NO SCHOOL – SUCCOS**	---
Wednesday, October 7	**NO SCHOOL – SUCCOS**	---
WEEK 7		
Monday, October 12	Finish Vectors; Motion in 2D; Start Projectile Motion	4.1-4.2
Wednesday, October 14	Projectile Motion (continued)	4.2
	(we'll skip relative motion and circular motion, Sec. 4.3-4.6, and come back to them later)	

Course Schedule, page 2 of 3 (tentative; subject to change):

Week / Date	Topics	Sections in Knight textbook
WEEK 8		
Monday, October 19	Force, Identifying Forces, Drawing FBDs (Free-Body Diagrams)	5.1-5.3
Wednesday, October 21	What do forces do? Newton's 1st and 2nd Laws	5.4-5.6
WEEK 9		
Monday, October 26	Catch-up; more free-body diagrams	5.7
Wednesday, October 28	Dynamics Problems using Newton's 2nd Law; Mass, Weight, and Gravity	6.1-6.3
WEEK 10		
Monday, November 2	Friction and Drag	6.4-6.5
Wednesday, November 4	More Examples of Newton's 2nd Law	6.6
WEEK 11		
Monday, November 9	Interacting Objects, Newton's 3rd Law	7.1-7.3
Wednesday, November 11	Ropes and Pulleys; Problems involving N3L	7.4-7.5
WEEK 12		
Monday, November 16	Circular Motion: Uniform circular motion, centripetal acceleration, non-uniform circular motion	4.4-4.6
Wednesday, November 18	Dynamics in Two Dimensions; Circular Motion, Circular Orbits	8.1-8.3

Course Schedule, page 3 of 3 (tentative; subject to change):

Week / Date	Topics	Sections in Knight textbook
WEEK 13		
Monday, November 23	Reasoning about Circular Motion; Nonuniform Circular Motion	8.4-8.5
Wednesday, November 25	**NO SCHOOL – THANKSGIVING**	---
WEEK 15		
Monday, November 30	Energy Overview; Work and Kinetic Energy for a single particle	9.1-9.3
Wednesday, December 2	Work Done by Springs; Dissipative Forces, Power	9.4-9.6
WEEK 16		
Monday, December 7	Potential Energy, Gravitational PE, Energy Bar Charts	10.1-10.2
Wednesday, December 9	Elastic PE, PE Diagrams, Conservation of Energy	10.3-10.5
WEEK 17		
Monday, December 14	Force and PE, Conservative vs. Nonconservative Forces, Energy Principle Revisited	10.6-10.8
Wednesday, December 16	Finish Energy	Ch. 10
WEEK 18		
Monday, December 21	Start Impulse and Momentum	Quick Summary of Ch. 11 for you to read over break
Wednesday, December 23	**NO SCHOOL – WINTER BREAK**	Read Ch. 11 over break!