Week	Day	Date	Event	Reading	Content	MCAT Content Categories	Matching Objectives from AAMC report *Scientific Foundations for Future Physicians*
1	Thu	August 21, 2014		Ch1 - Physics: An Introduction - 1.1 to 1.6	Units, estimation & scaling	4A. Translational Motion:: Units and dimensions	E1-1.b. Explain dimensional differences using numerical relationships, such as ratios and proportions. E1-1.c. Use dimensional analysis and unit conversions to compare results expressed in different systems of units.
2	Tue	August 26, 2014		Ch2 - Linear Motion - 2.1-2.4	1D-motion, velocity & acceleration	4A. Translational Motion:: Speed, velocity (avg and instantaneous) 4A. Translational Motion:: Acceleration	
	Thu	August 28, 2014		Ch3 - Motion in Two Dimensions - 3.1-3.5	Vectors! Vectors! Vectors!; 2D-Motion	4A. Translational Motion:: Vectors, components 4A. Translational Motion:: Vector addition	
3	Tue	September 2, 2014		Ch4 - Newton's Laws of Motion - 4.1-4.4 Ch7 - Linear Momentum - 7.1, 7.4	Newton's 1st and 2nd laws; Momentum perspective; Free-body diagrams	4A. Equilibrium:: Concept of force, units 4A. Equilibrium:: Newton's 1st Law, inertia 4A. Equilibrium:: Analysis of forces acting on an object	E3-1.a. Explain the interrelationships among work, energy, force, and acceleration.
	Thu	September 4, 2014		Catch Up - No new reading	Newton's 3rd law; Conservation of momentum; Center of mass	4A. Equilibrium:: Analysis of forces acting on an object: Newton's Third Law	
4	Tue	September 9, 2014		Ch4 - Newton's Laws of Motion - 4.5-4.6 Ch7 - Linear Momentum - 7.2, 7.6	Friction and drag forces	4A. Equilibrium:: Analysis of forces acting on an object: Friction/drag	E3-1.d. Apply knowledge of mechanics to movement in biological systems at various scales, from the molecular to the organismal.
	Thu	September 11, 2014		Ch5 - Application of Newton's Laws - 5.1-5.4	Centripetal forces; Inertial reference frames	4A. Translational Motion:: Vectors, components: Circular motion 4A. Translational Motion:: Vector addition 4A. Equilibrium:: Analysis of forces acting on an object	E3-1.b. Apply knowledge of centripetal acceleration to "g-force" devices used to train jet pilots and astronauts.
5	Tue	September 16, 2014		Ch5 - Application of Newton's Laws - 5.5 Ch25 - Relativity - 25.1			
	Thu	September 18, 2014	**EXAM 1**	**in class + take-home**			
6	Tue	September 23, 2014		Ch8 - Rotational Motion - 8.5, 8.2-8.3	Rotational version of Newton's 2nd law: torque and moment of inertia	4A. Equilibrium:: Torques, lever arms	
	Thu	September 25, 2014		Ch8 - Rotational Motion - 8.6, 8.8	Torques and static equilibrium in the musculoskeletal system	4A. Equilibrium:: Torques, lever arms	E6-4.a. Apply understanding of force and torque to explain why small differences in muscle insertion make a significant difference in the speed and force created by limb movement.
7	Tue	September 30, 2014		Ch6 - Work and Energy - 6.1-6.3 Ch8 - Rotational Motion - 8.1	Work and kinetic energy; Rotational kinetic energy	4A. Energy:: Kinetic energy, units 4A. Work:: Work-Kinetic Energy Theorem 4A. Work:: Derived units, sign conventions	E3-1.a. Explain the interrelationships among work, energy, force, and acceleration.
	Thu	October 2, 2014		Ch6 - Work and Energy - 6.4-6.6	Potential energy; Conservation of energy	4A. Work:: Mechanical advantage 4A. Energy:: Potential energy: local gravitation, elastic 4A. Energy:: Conservative forces	E3-6.a. Use input–output relationships to understand the efficiency of converting food energy into muscular motion. E6-4.b. Explain the role of motor proteins in contraction and cellular movement. E5-2.f. Explain how energy stored in ATP is transduced by motor proteins to produce movement.
8	Tue	October 7, 2014		Ch6 - Work and Energy - 6.7-6.8 Ch8 - Rotational Motion - 8.4 Ch7 - Linear Momentum - 7.3, 7.5	More conservation of energy; Elastic vs inelastic collisions	4A. Energy:: Conservation of Energy 4A. Energy:: Power, units	
	Thu	October 9, 2014		Ch12 - Oscillations - 12.1-12.4	Simple harmonic motion; energy in oscillations	4A. Energy:: Conservation of Energy:: Spring	
9	Tue	October 14, 2014		Ch12 - Oscillations - 12.5-12.8	Damped and driven oscillators	4A. Energy:: Conservation of Energy:: Pendulum	
	Thu	October 16, 2014	Fall Break				
10	Tue	October 21, 2014	**EXAM 2**	**in class + take-home**			
	Thu	October 23, 2014		Ch9 - Elasticity and Fracture - 9.1-9.4	Stress and strain; Yield and fracture		
11	Tue	October 28, 2014		Ch14 - Thermodynamics I - 14.1-14.4	Temperature; Micro/macro connection of thermal phenomena	5B. Thermodynamics:: 0th Law - concept of temperature 4B. Gas Phase:: Absolute temperature (Kelvin scale) 4B. Gas Phase:: Kinetic molecular theory of gases 4B. Gas Phase:: Boltzmann's constant 4B. Gas Phase:: Deviation from ideal gas law: van der Waals 4B. Gas Phase:: Heat capacity at constant volume or pressure 5B. Thermodynamics:: Coefficient of expansion	E2-5.c. Distinguish the role of indeterminacy in natural phenomena and the impact of stochastic factors (e.g., radioactive decay) from the role of deterministic processes.
	Thu	October 30, 2014		Ch14 - Thermodynamics I - 14.5-14.7	Latent heat; Heat transfer; Thermoregulation	5B. Thermodynamics:: Heat transfer - conduction, convection, radiation 5B. Thermodynamics:: Heat of fusion, heat of vaporization 5B. Thermodynamics:: Calorimetry, heat capacity, specific heat	E3-4.a. Explain mechanisms of heat transfer. E3-6.b. Apply negative feedback principles to explain how temperature is regulated in buildings and in the human body. E7-2.c. Explain how organisms sense and adapt to a change in environmental temperature. E1-7.b. Explain homeostasis in terms of positive or negative feedback.
12	Tue	November 4, 2014		Ch15 - Thermodynamics II - 15.1-15.2	1st Law of Thermodynamics (Conservation of energy again)	5B. Thermodynamics:: Thermodynamic system - state function 5B. Thermodynamics:: 1st Law - conservation of energy 4A. Work:: PV diagram: work done	E3-4.b. Apply knowledge of the laws of thermodynamics to processes at various scales.

	Thu	November 6, 2014		Ch15 - Thermodynamics II - 15.3-15.5 Supplement: Diffusion at OpenStax Physics	Diffusion and entropy; 2nd Law of Thermodynamics	5B. Thermodynamics:: 2nd Law - concept of entropy 5B. Thermodynamics:: Entropy as a measure of "disorder" 5B. Thermodynamics:: Relative entropy for gas, liquid and crystal states	E3-4.b. Apply knowledge of the laws of thermodynamics to processes at various scales. E3-4.c. Explain the thermodynamics of simple diffusion through biological membranes. E3-4.b. Apply knowledge of the laws of thermodynamics to processes at various scales. E7-1.d. Explain how the competing needs to exchange gases and retain water are met in terrestrial organisms.
13	Tue	November 11, 2014		Ch11 - Fluids - 11.1-11.5	Density and pressure; Osmotic pressure	4B. Fluids:: Density, specific gravity 4B. Fluids:: Hydrostatic pressure: Pascal's Law, pressure vs depth	E7-1.b. Explain the mechanisms by which cells maintain cell volume in the face of changing extracellular osmolarity.
	Thu	November 13, 2014		Ch11 - Fluids - 11.6-11.7	Static pressure; Buoyancy	4B. Fluids:: Buoyancy, Archimedes' Principle	E3-1.c. Explain the mechanical basis for molecular and cellular separation technologies (i.e., centrifugation and chromatography).
14	Tue	November 18, 2014		Ch11 - Fluids - 11.8-11.10	Fluid flow; Bernoulli's Eqn; Viscosity	4B. Fluids:: Continuity equation (Av=constant) 4B. Fluids:: Bernoulli's equation 4B. Fluids:: Viscosity: Poiseuille Flow 4B. Fluids:: Concept of turbulence at high velocities 4B. Fluids:: Venturi effect, Pitot tube 4B. Fluids:: Surface tension	E3-1.c. Explain the mechanical basis for molecular and cellular separation technologies (i.e., centrifugation and chromatography). E3-4.d. Explain how viscosity affects blood flow. E6-4.c. Explain the physics of how blood movement and pressure are affected by vessel diameter. E7-1.c. Explain an example of how pumps move substrates and fluids within the body, or between the internal and external environments.
	Thu	November 20, 2014	**EXAM 3**	**in class + take-home**			
	Tue	November 25, 2014	Thanksgiving Break				
	Thu	November 27, 2014	Thanksgiving Break				
15	Tue	December 2, 2014		Ch13 - Waves - 13.1-13.4	Introduction to waves; Adding waves together; Interference; Dynamical systems in biology	4D. Sound:: Production of sound 4D. Sound:: Relative speed of sound in solids, liquids and gases 4D. Sound:: Resonance in pipes and strings 4D. Sound:: Intensity of sound, decibel units, log scale 4D. Sound:: Pitch	E3-6.c. Apply positive feedback principles to explain action potentials.
	Thu	December 4, 2014		Ch13 - Waves - 13.5-13.9	Sound level; Doppler effect	4D. Sound:: Attenuation (damping) 4D. Sound:: Doppler effect: moving sound source or observer 4D. Sound:: Ultrasound 4D. Sound:: Shock waves	E3-3.c. Apply knowledge of sound waves to describe the use and limitations of ultrasound imaging.
	Mon	December 8, 2014	**FINAL EXAM @ 3:00 PM**				

Additional *SFFP* Objectives covered throughout the semester:

E1-1.a. Express and analyze natural phenomena in quantitative terms that include an understanding of the natural prevalence of logarithmic/exponential relationships (e.g., rates of change, pH).
E1-1.d. Utilize the Internet to find relevant information, synthesize it, and make inferences from the data gathered.
E1-2.a. Create and interpret appropriate graphical representations of data, such as a frequency histogram, from discrete data.
E1-2.b. Identify functional relationships from visually represented data, such as a direct or inverse relationship between two variables.
E1-2.c. Use spatial reasoning to interpret multidimensional numerical and visual data.
E1-5.a. Describe the basic characteristics of models (e.g., multiplicative vs. additive).
E1-6.a. Define a scientific hypothesis and design an experimental approach to test its validity.
E1-6.c. Critically evaluate whether conclusions from a scientific study are warranted.
E1-6.d. Distinguish correlation from causality.
*** Others will be covered by the lab, especially those under Competency E2