

Week	Day	Date	Reading	Content	MCAT Content Categories	Matching Objectives from AAMC report <i>Scientific Foundations for Future Physicians</i>
1	Tue	January 10, 2017	Ch16 - Electrostatics I 16.1-16.3	Electric Charge/ Coulomb's Law	4C. Electrostatics:: Charge, conductors, charge conservation 4C. Electrostatics:: Insulators	E1-2c. Use spatial reasoning to interpret multidimensional numerical and visual data (e.g., protein structure or geographic information or electric/magnetic fields). E4-3a. Distinguish between ionic interactions, van derWaals interactions, hydrogen bonding, and hydrophobic interactions.
	Thu	January 12, 2017	Ch16 - Electrostatics I 16.4	Electric Field	4C. Electrostatics:: Electric field: field lines 4C. Electrostatics:: Electric field due to charge distribution	
2	Tue	January 17, 2017	Ch16 - Electrostatics I 16.5	Electric Field due to charge distributions	4C. Electrostatics:: Electric field due to charge distribution	
	Thu	January 19, 2017	Ch16 - Electrostatics I 16.6	Gauss' Law		
3	Tue	January 24, 2017	Ch16 - Electrostatics I 16.7	Gauss' Law	4C. Electrostatics:: Electric field due to charge distribution	
	Thu	January 26, 2017	Ch17 - Electrostatics II 17.1-17.3	Electric Potential, Equipotential	4C. Electrostatics:: Potential difference, absolute potential at a location	
4	Tue	January 31, 2017	Ch17 - Electrostatics II 17.4-17.7	Capacitors, Capacitor Combinations and Dielectrics	4C. Circuit Elements:: Capacitance 4C. Circuit Elements:: Parallel plate capacitor 4C. Circuit Elements:: Dielectrics 4C. Circuit Elements:: Capacitors in series 4C. Circuit Elements:: Capacitors in parallel 4C. Circuit Elements:: Energy of charged capacitor	E3-2c. Apply understanding of electrical principles to the hazards of electrical currents and voltages.
	Thu	February 2, 2017	Ch18 - Moving Charges 18.1-18.3	Current and Resistance	4C. Circuit Elements:: Current, sign conventions, units 4C. Circuit Elements:: Electromotive force, voltage 4C. Circuit Elements:: Resistance, Ohm's Law 4C. Circuit Elements:: Resistivity	
5	Tue	February 7, 2017	Ch18 - Moving Charges 18.4-18.6	DC circuits; Power	4C. Circuit Elements:: Resistors in series 4C. Circuit Elements:: Resistors in parallel 4C. Circuit Elements:: Conductivity: Metallic 4C. Circuit Elements:: Meters	E7-2a. Explain how altering ion channel permeability contributes to electrical signaling within and between cells.
	Thu	February 9, 2017	<b>EXAM #1</b>			
6	Tue	February 14, 2017	Ch18 - Moving Charges 18.7-18.8	RC Combinations; Bioelectricity	4C. Circuit Elements:: Conductivity: Electrolytic	E3-2a. Explain how the time to charge or discharge a capacitor depends on the capacitance and the resistance in the charging or discharging circuit. E3-6.c. Apply positive feedback principles to explain action potentials. E3-2b. Apply concepts of resistance and capacitance to the electrical properties of myelinated and unmyelinated axons and how those properties affect the travel speed of action potentials in those types of neurons. E6-2b. Explain how myelinated axons accelerate the conduction of action potentials as compared to unmyelinated axons.
	Thu	February 16, 2017	Ch19 - Magnetism 19.1-19.2	Magnetic Forces and Fields	4E. Atomic Nucleus:: Mass spectrometer	
7	Tue	February 21, 2017	Ch19 - Magnetism 19.3-19.5	Ampere's Law		E3-2d. Describe how electrical currents establish magnetic fields and how time-varying magnetic fields induce electrical currents in materials, such as metals or biological tissue. E3-2d. Describe how electrical currents establish magnetic fields and how time-varying magnetic fields induce electrical currents in materials, such as metals or biological tissue. E3-5b. Apply physical principles to explain the generation, detection, and analysis of magnetic resonance signals.
	Thu	February 23, 2017	Ch20 - Magnetic Induction 20.1-20.4	Faraday and Lenz's Law	4E. Electronic Structure:: Paramagnetism and diamagnetism	
8	Tue	February 28, 2017	Ch20 - Magnetic Induction 20.5-20.6 Ch22 - ElectroMagnetic Waves 22.2	LRC Circuits Maxwell's Equations	4D. Light, EM Radiation:: Classification of EM spectrum, photon energy 4D. Light, EM Radiation:: Visual spectrum, color 4D. Light, EM Radiation:: Properties of EM radiation 4D. Light, EM Radiation:: Velocity in vacuo 4D. Light, EM Radiation:: Perpendicularly oscillating E and B fields, propagation direction 4D. Geometrical Optics:: Refraction, refractive index, Snell's Law	
	Thu	March 2, 2017	Ch22 - ElectroMagnetic Waves 22.1 Ch23 - Wave Properties of Light 23.1	Maxwell's Equations and EM wave properties Refraction and Snell's law		
March 5-13, 2016			Spring Break			
9	Tue	March 14, 2017	Ch23 - Wave Properties of Light 23.2-23.4	Reflection, Dispersion and Polarization	4D. Geometrical Optics:: Reflection from plane surface 4D. Geometrical Optics:: Conditions for total internal reflection 4D. Light, EM Radiation:: Dispersion, change of index with wavelength 4D. Light, EM Radiation:: Polarization of light 4D. Light, EM Radiation:: Circular polarization	
	Thu	March 16, 2017	<b>EXAM #2</b>			
10	Tue	March 21, 2017	Ch23 - Wave Properties of Light 23.5-23.7	Interference and Diffraction	4D. Light, EM Radiation:: Concept of interference, Young double-slit expt 4D. Light, EM Radiation:: Thin films, diffraction grating, single-slit diffraction 4D. Light, EM Radiation:: Other diffraction phenomenon, x-ray diffraction	E3-3b. Apply wave optics to understand the limits of image resolution in the eye. E4-2d. Explain how molecular structure is determined by X-ray diffraction and spectroscopic methods.
	Thu	March 23, 2017	Ch24 - Geometric Optics 24.1-24.5	Plane and Spherical Mirrors	4D. Geometrical Optics:: Spherical mirrors: center of curvature, focal length 4D. Geometrical Optics:: Real and virtual images	
11	Tue	March 28, 2017	Ch24 - Geometric Optics 24.6-24.7	Lenses and Lens Combinations	4D. Geometrical Optics:: Thin lenses: converging and diverging 4D. Geometrical Optics:: Lensmakers formula 4D. Geometrical Optics:: Combination of lenses	E3-3a. Apply geometric optics to understand image formation in the eye. E3-3b. Apply wave optics to understand the limits of image resolution in the eye.
	Thu	March 30, 2017	supplemental: Physics of the Eye @ OpenStax Physics Vision Correction @ OpenStax Physics	Human eye as an optical instrument; optical strength in diopters	4D. Geometrical Optics:: Optical instruments (including human eye) 4D. Geometrical Optics:: Lens strength, diopters	
12	Tue	April 4, 2017	supplemental: Microscopes @ OpenStax Physics	Aberration; Physics of microscopy	4D. Geometrical Optics:: Optical instruments (including human eye) 4D. Geometrical Optics:: Lens aberration	

Thu	April 6, 2017	Ch26 - Modern & Atomic Physics 26.2,26.4	Photoelectric effect Wave/particle duality de Broglie wavelength	4E. Electronic Structure:: Photoelectric effect 4E. Electronic Structure:: Heisenberg Uncertainty Principle	E3-5a. Use knowledge of atomic structure to explain the origin of ionizing radiation and its interaction with matter. E3-5d. Apply the principles of electromagnetic radiation and its interactions with matter.
13 Tue	April 11, 2017	Ch26 - Modern & Atomic Physics 26.5-26.6	Atomic Spectra; Bohr Model of the Atom	4E. Electronic Structure:: Ground state, excited states 4E. Electronic Structure:: Absorption and emission line spectra 4E. Electronic Structure:: Bohr atom	E3-5a. Use knowledge of atomic structure to explain the origin of ionizing radiation and its interaction with matter. E3-5d. Apply the principles of electromagnetic radiation and its interactions with matter. E3-5b. Apply physical principles to explain the generation, detection, and analysis of magnetic resonance signals. E3-5c. Apply knowledge of molecular energy levels to explain how structural information is obtained from vibrational spectroscopy.
Thu	April 13, 2017	<b>EXAM #3</b>			
14 Tue	April 18, 2017	Ch25 - Relativity 25.1-25.2 supplemental: Relativity of Simultaneity	Newtonian relativity and its failure in the Michelson-Morley experiment; Definitions in spacetime; Relativity of simultaneity		
Thu	April 20, 2017	Ch25 - Relativity 25.3-25.4 supplemental: Relativity of Simultaneity	Time dilation, length contraction and resolving paradoxes in spacetime		
Wed	May 3, 2017	<b>FINAL EXAM @ 9:00 AM</b>			

**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.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.  
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