

MCAT Physics Topics Listed by UD Course Number

PHY 201	<p>Translational Motion</p> <ul style="list-style-type: none"> <li>• Units and dimensions</li> <li>• Vectors, components</li> <li>• Vector addition</li> <li>• Speed, velocity (average and instantaneous)</li> <li>• Acceleration</li> </ul> <p>Equilibrium</p> <ul style="list-style-type: none"> <li>• Concept of force, units</li> <li>• Analysis of forces acting on an object</li> <li>• Newton's First Law of Motion, inertia</li> <li>• Torques, lever arms</li> </ul> <p>Work</p> <ul style="list-style-type: none"> <li>• Derived units, sign conventions</li> <li>• Mechanical advantage</li> <li>• Work Kinetic Energy Theorem</li> </ul> <p>Energy</p> <ul style="list-style-type: none"> <li>• Kinetic Energy: <math>KE = \frac{1}{2} mv^2</math>; units</li> <li>• Potential Energy <ul style="list-style-type: none"> <li>○ <math>PE = mgh</math> (gravitational, local)</li> <li>○ <math>PE = \frac{1}{2} kx^2</math> (spring)</li> </ul> </li> <li>• Conservation of energy</li> <li>• Conservative forces</li> <li>• Power, units</li> </ul> <p>Fluids</p> <ul style="list-style-type: none"> <li>• Density, specific gravity</li> <li>• Buoyancy, Archimedes' Principle</li> <li>• Hydrostatic pressure <ul style="list-style-type: none"> <li>○ Pascal's Law</li> <li>○ Hydrostatic pressure; <math>P = \rho gh</math> (pressure versus depth)</li> </ul> </li> <li>• Viscosity: Poiseuille Flow</li> <li>• Continuity equation (<math>A \cdot v = \text{constant}</math>)</li> <li>• Concept of turbulence at high velocities</li> <li>• Surface tension</li> <li>• Bernoulli's equation</li> <li>• Venturi effect, pitot tube</li> </ul>
PHY 202	<p>Electrostatics</p> <ul style="list-style-type: none"> <li>• Charge, conductors, charge conservation</li> <li>• Insulators</li> <li>• Electric field <b>E</b> <ul style="list-style-type: none"> <li>○ Field lines</li> <li>○ Field due to charge distribution</li> </ul> </li> <li>• Potential difference, absolute potential at point in space</li> </ul> <p>Circuit Elements</p> <ul style="list-style-type: none"> <li>• Current <math>I = \Delta Q / \Delta t</math>, sign conventions, units</li> <li>• Electromotive force, voltage</li> </ul>

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	<ul style="list-style-type: none"><li>• Resistance<ul style="list-style-type: none"><li>○ Ohm's Law: <math>I = V/R</math></li><li>○ Resistors in series</li><li>○ Resistors in parallel</li><li>○ Resistivity: <math>\rho = R \cdot A/L</math></li></ul></li><li>• Capacitance<ul style="list-style-type: none"><li>○ Parallel plate capacitor</li><li>○ Energy of charged capacitor</li><li>○ Capacitors in series</li><li>○ Capacitors in parallel</li><li>○ Dielectrics</li></ul></li><li>• Conductivity<ul style="list-style-type: none"><li>○ Metallic</li><li>○ Electrolytic</li></ul></li><li>• Meters</li></ul> <p>Sound</p> <ul style="list-style-type: none"><li>• Production of sound</li><li>• Relative speed of sound in solids, liquids, and gases</li><li>• Intensity of sound, decibel units, log scale</li><li>• Attenuation (Damping)</li><li>• Doppler Effect: moving sound source or observer, reflection of sound from a moving object</li><li>• Pitch</li><li>• Resonance in pipes and strings</li><li>• Ultrasound</li><li>• Shock waves</li></ul> <p>Light, Electromagnetic Radiation</p> <ul style="list-style-type: none"><li>• Concept of Interference; Young Double-slit Experiment</li><li>• Thin films, diffraction grating, single-slit diffraction</li><li>• Other diffraction phenomena, X-ray diffraction</li><li>• Polarization of light</li><li>• Circular polarization</li><li>• Properties of electromagnetic radiation<ul style="list-style-type: none"><li>○ Velocity equals constant <math>c</math>, <i>in vacuo</i></li><li>○ Electromagnetic radiation consists of perpendicularly oscillating electric and magnetic fields; direction of propagation is perpendicular to both</li></ul></li><li>• Classification of electromagnetic spectrum, photon energy <math>E = (hf)</math></li><li>• Visual spectrum, color</li></ul> <p>Geometrical Optics</p> <ul style="list-style-type: none"><li>• Reflection from plane surface: angle of incidence equals angle of reflection</li><li>• Refraction, refractive index <math>n</math>, Snell's law: <math>n_1 \sin \vartheta_1 = n_2 \sin \vartheta_2</math></li><li>• Dispersion, change of index of refraction with wavelength</li><li>• Conditions for total internal reflection</li><li>• Spherical mirrors<ul style="list-style-type: none"><li>○ Center of curvature</li><li>○ Focal length</li></ul></li></ul>
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	<ul style="list-style-type: none"><li>○ Real and virtual images</li><li>● Thin lenses<ul style="list-style-type: none"><li>○ Converging and diverging lenses</li><li>○ Use of formula <math>1/p + 1/q = 1/f</math>, with sign conventions</li><li>○ Lens strength, diopters</li></ul></li><li>● Combination of lenses</li><li>● Lens aberration</li><li>● Optical Instruments, including the human eye</li></ul> <p>Electronic Structure</p> <ul style="list-style-type: none"><li>● Orbital structure of hydrogen atom, principal quantum number <math>n</math>, number of electrons per orbital</li><li>● Ground state, excited states</li><li>● Absorption and emission line spectra</li><li>● Use of Pauli Exclusion Principle</li><li>● Conventional notation for electronic structure</li><li>● Bohr atom</li><li>● Effective nuclear charge</li><li>● Photoelectric effect</li></ul>
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