Survey of Physics Syllabus: 10-806-139

Class Meeting Structure:  Weekly 2 hour lecture  
Weekly 3 hour lab/problem-solving session

Course Description:  Introduction to physics concepts common to mechanical, electrical, thermal, fluid, and optical systems. A brief overview of modern physics is included.

Required Textbook:  Inquiry into Physics by Ostdiek and Bord

Homework:  There will be weekly graded homework assignments, consisting of a mix of conceptual questions and mathematical word problems.

Exams:  There will be three mid-term exams and a final consisting of conceptual questions and mathematical word problems

Labs:  The lab grade may come from a variety of sources; lab assignments to be turned in, lab quizzes, or written lab reports

Grades:  Exam, homework and laboratory percentages will be calculated separately. Then grades will be weighted on the following distribution:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Exams</td>
<td>50%</td>
</tr>
<tr>
<td>Homework</td>
<td>25%</td>
</tr>
<tr>
<td>Laboratory</td>
<td>25%</td>
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Summary of Course Topics and Suggested Lab Activities:

Math Review:  Metric system and scientific notation, Unit conversion using dimensional analysis

Chapter 1 – The Study of Motion:  Velocity, linear acceleration, acceleration due to gravity, centripetal acceleration.
Suggested Labs:  Graphical interpretation of velocity and acceleration, measuring g

Chapter 2 – Newton’s Laws:  Newton’s Laws of Motion, mass vs. weight, friction, centripetal force, law of universal gravitation.
Suggested Labs:  Newton’s 2\textsuperscript{nd} Law, calculating coefficients of friction, adding force vectors graphically
Suggested Labs: Conservation of energy with a projectile launcher, calculating your own horsepower, ballistic pendulum

Chapter 4 – Physics of Matter: Pressure, density, Pascal’s principle, Archimedes’ principle, Bernoulli’s Principle.  
Suggested Labs: Hydraulic jack lab, Archimedes’ Principle

Chapter 5 – Temperature and Heat: Temperature scales, thermal expansion, heat, specific heat, heat engines, heat transfer.  
Suggested Labs: Calorimetry, Mechanical Equivalent of heat

Chapter 6 – Waves and Sound: Transverse and Longitudinal waves, speed of waves on a string, frequency, velocity and wavelength, interference, sound waves.  
Suggested Labs: Speed of waves on a string, sound wave interference

Chapter 7 - Electricity: Properties of electric charge, coulomb’s law, electric fields, current, resistance, Ohm’s Law, series and parallel circuits, electric power, AC and DC.  
Suggested Labs: Ohm’s Law, Mapping electric fields

Chapter 8 – Magnetism and EM Waves: Properties of magnets, relationships between electricity and magnetism, solenoids, electric motors, electromagnetic induction, transformers, the electromagnetic spectrum.  
Suggested Labs: Solenoid Balance Lab, Force on a Current-Carrying Wire

Chapter 9 – Optics: Reflection, refraction, diffraction, interference, polarization, total internal reflection and fiber optics, forming images and thin lens formula, the human eye  
Suggested Labs: Reflection, refraction and total internal reflection, Human eye lab

Chapter 10 – Atomic Physics: Bohr’s Model of the atom and atomic spectra, deBroglie waves, lasers

Chapter 11 – Nuclear Physics: Three types of radiation, half-life and radioactive dating, fission and fusion

If Time Allows:

Chapter 12 – Special Relativity: Postulates and predications of special relativity