**MASTER COURSE OUTLINE**
Prepared By: Jim Hamm Date: September 2017

**COURSE TITLE**
General Physics II with Lab

**GENERAL COURSE INFORMATION**

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|---|---|---|
| Dept.: PHYS& | Course Num: 115 | (Formerly: ) |
| CIP Code: 40.0801 | Intent Code: 11 | Program Code: |
| Credits: 5 | | |
| Total Contact Hrs Per Qtr.: 66 | | |
| Lecture Hrs: 44 | Lab Hrs: 22 | Other Hrs: 0 |
| Distribution Designation: Lab Science LS | | |

**COURSE DESCRIPTION** (as it will appear in the catalog)
The second course in a three-quarter algebra-based sequence. A balance of conceptual understanding and problem-solving ability is emphasized; laboratory and lecture are integrated in the sequence. In this second quarter the topics studied will include fluids, oscillations, waves and sound, thermodynamics, geometric and physical optics.

**PREREQUISITES**
Completion of PHYS& 114 with 2.0 or higher.

**TEXTBOOK GUIDELINES**
An algebra-based physics textbook (usually called *College Physics*), such as those by Douglas Giancoli, Hugh Young, Nicholas Giordano, or Knight, Jones, and Field.

**COURSE LEARNING OUTCOMES**
*Upon successful completion of the course, students should be able to demonstrate the following knowledge or skills:*

1. Apply algebra and right-angle trigonometry to the solution of problems involving fluids, oscillations, waves, sound, thermodynamics, geometric and physical optics.
2. Apply conceptual reasoning to analyze situations involving the material studied in this course.
3. Present well-reasoned solutions of problems.
4. Present experimental results in clearly written laboratory reports.
5. Use technology such as calculators and computer spreadsheets to perform calculations, analyze data, and present data in graphical form at levels appropriate for the course.

**INSTITUTIONAL OUTCOMES**
IO2 Quantitative Reasoning: Students will be able to reason mathematically.

**COURSE CONTENT OUTLINE**
1. Fluids
   Density and pressure

- Buoyancy
- Motion of fluids
- Viscosity

2. Oscillations
   - Describing simple harmonic motion
   - Energy in simple harmonic motion
   - Pendulum motion
   - Damped and driven oscillations
3. Waves and Sound
   - Types of waves
   - Mathematical and graphical descriptions of waves
   - Sinusoidal waves
   - Pressure waves and sound
   - Wave power and intensity
   - Loudness of sound and the decibel scale
   - The Doppler effect and shock waves
   - Superposition and standing waves
   - Speech and hearing
   - Interference of waves
4. Thermodynamics
   - The atomic model of matter
   - Thermal expansion
   - The ideal-gas law
   - Calorimetry
   - Thermal properties of gases
   - Heat transfer processes
   - Thermodynamic processes
   - The first and second laws of thermodynamics
5. Geometric Optics
   - The ray model of light
   - Reflection and refraction
   - Image formation with thin lenses and mirrors
   - Thin lenses
   - Optical instruments: the camera, the eye, magnifiers, microscopes, and telescopes
   - Dispersion
6. Physical Optics
   - The wave nature of light
   - Interference from thin films and multiple sources
   - Diffraction from single slits and circular apertures

**DEPARTMENTAL GUIDELINES** *(optional)*

EVALUATION METHODS/GRADING PROCEDURES: Exams and Quizzes 50-60% Homework 20-30% Laboratory Reports 20% PLANNED TEACHING METHODS/LEARNING STRATEGIES: Lecture In-class active learning Small group work Laboratory observation, measurement, and Experimentation

PO5 should be assessed: Students will be able to solve problems by gathering, interpreting, combining and/or applying information from multiple sources.

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**DIVISION CHAIR APPROVAL** **DATE**