Statement regarding how the course meets expectations for General Education

(1) A brief statement regarding how the course meets the mission of general education.

The General Education Program at Eastern Oregon University challenges students to become critical, creative thinkers and engaged, knowledgeable citizens, open to new ways of looking at the world. Physics by its very nature challenges students to become critical, creative thinkers. Students come into the course with little background and very often have preconceived, "Artistotlean" notions of how the physical world behaves. This course challenges those preconceptions, especially through laboratory exercises, and encourages students to modify their conceptions of the physical world to better reflect physical realities. In addition, this course seeks to show students how physical "truths" are formulated through the process of doing science. Homework and laboratory exercises are challenging and encourage students to develop their problem-solving skills in and out of class. We introduce modeling methods and illustrate their use not only in physics but in other disciplines. Overall, we seek to illustrate the applications of physics to a broad range of subjects outside the classroom.

(2) Identify which components of the general education requirements will be met by completion of this course.

This course will fulfil the new general education Category 3: Study of the Natural World.

(3) Identify the specific general education outcomes that the course will address and describe how the course will assess these outcomes in relation to student achievement.

From the New General Education requirements:
"A liberally educated person should be familiar with the methodology, practice, and controversies regarding the academic study of the natural world. Students will choose from specifically designed course work in variety of disciplines. Upon completion of course work in this category, students should be able to employ scientific methods in the laboratory or in fieldwork as defined by the specific discipline(s) or sub-discipline(s) the student has studied, analyze and evaluate data based on discipline-defined criteria, observe accurately, integrate knowledge and data with the fundamental concepts of the specific discipline(s) or sub-discipline(s) the student has studied, and report results effectively both orally and in writing."

Specific outcomes relating to these requirements are: students completing PHYS 202 will be able to

- Apply Newton's laws to the rotational motion of extended bodies,
- Solve statics problems involving torque and forces,
- Analyze rotating systems in terms of energetics,
- Describe the origin of oscillations in elastic matter,
- Apply mathematics to the description of waves,
- Describe sound waves and the basic mechanism of hearing,

- Apply the decibel scale to sound intensity,
- Describe the origin of temperature scales,
- Apply the ideal gas law to common situations,
- Apply heat exchange principles to calorimetry problems,
- State the first and second laws of thermodynamics and describe their implications, and
- Apply Snell's law to the refraction of light,
- Draw ray-tracing diagrams of reflected and refracted rays of light,
- Apply the lens equation to problems involving lenses or mirrors,
- Describe the contribution of the following to the development of scientific thought: Young, Fourier, Helmholtz, Boyle, Carnot, Joule, and Boltzmann,
- clearly describe, in a notebook, measurements they have done in the laboratory and the subsequent analysis of those measurements, relating them to theory.

These outcomes will be assessed as follows. Two midterm exams and a final exam are given. Homework is assigned twice a week, graded, and returned. A unit exam is given at the end of every chapter, and students must pass each of these with a 75% or better. Unit exams not passed may be repeated until the student scores 75% or better. Students keep a laboratory notebook, which is turned in and graded weekly.

General Education Syllabus
Eastern Oregon University
College of Arts and Sciences
Course Syllabus

PHYS 202

General Physics

Catalog Description for the PHYS 201-203 sequence: An introductory college physics sequence for those whose majors are not in the physical sciences or engineering, which includes the principles of mechanics, waves, sound, thermodynamics, electricity, magnetism, optics, relativity, and quantum theory.

Prerequisites: PHYS 201 or equivalent, and a good facility with college-level algebra. Math 112 recommended.

Format (1) On campus: 3 1-hour lecture per week, and 1 3-hour lab per week. (2) Through the Division of Distance Education: individualized study format.

Credit hours: 4.

General Education Course Information

A. **Response to the mission statement:** General Physics addresses the mission in several ways. Physics by its very nature challenges students to become critical, creative thinkers. Students come into the course with little background and very often have preconceived, "Artistotlean" notions of how the physical world behaves. This course challenges those preconceptions, especially through laboratory exercises, and encourages students to modify their conceptions of the physical world to better reflect physical realities. In addition, this course seeks to show students how physical "truths" are formulated through the process of doing science. Homework and laboratory exercises are challenging and encourage students to develop their problem-solving skills in and out of class. We introduce modeling methods and illustrate their use not only in physics but in other disciplines. Overall, we seek to illustrate the applications of physics to a broad range of subjects outside the classroom.

B. **General Education Requirements met:** Category Three - Study of the Natural World.

"A liberally educated person should be familiar with the methodology, practice, and controversies regarding the academic study of the natural world. Students will choose from specifically designed course work in variety of disciplines. Upon completion of course work in this category, students should be able to employ scientific methods in the laboratory or in fieldwork as defined by the specific discipline(s) or sub-discipline(s) the student has studied, analyze and evaluate data based on discipline-defined criteria, observe accurately, integrate knowledge and

data with the fundamental concepts of the specific discipline(s) or sub-discipline(s) the student has studied, and report results effectively both orally and in writing."

Outcomes: Upon completing PHYS 202, students will be able to

- Apply Newton's laws to the rotational motion of extended bodies,
- Solve statics problems involving torque and forces,
- Analyze rotating systems in terms of energetics,
- Describe the origin of oscillations in elastic matter,
- Apply mathematics to the description of waves,
- Describe sound waves and the basic mechanism of hearing,
- Apply the decibel scale to sound intensity,
- Describe the origin of temperature scales,
- Apply the ideal gas law to common situations,
- Apply heat exchange principles to calorimetry problems,
- State the first and second laws of thermodynamics and describe their implications, and
- Apply Snell's law to the refraction of light,
- Draw ray-tracing diagrams of reflected and refracted rays of light,
- Apply the lens equation to problems involving lenses or mirrors,
- Describe the contribution of the following to the development of scientific thought: Young, Fourier, Helmholtz, Boyle, Carnot, Joule, and Boltzmann,
- clearly describe, in a notebook, measurements they have done in the laboratory and the subsequent analysis of those measurements, relating them to theory.

Means of Assessment: Two midterm exams and a final exam are given. Homework is assigned twice a week, graded, and returned. A unit exam is given at the end of every chapter, and students must pass each of these with a 75% or better. Unit exams not passed may be repeated until the student scores 75% or better. Students keep a laboratory notebook, which is turned in and graded weekly.

Brief Outline of Course: topics to be studied are, in summary,

- Torque and Angular Momentum.
- Elasticity and Oscillations.
- Waves.
- Sound.
- Temperature and the Ideal Gas Law.
- Heat and heat flow.
- Reflection and Refraction of Light.

Grading Policies: Each assessment category is weighted as follows:

Assessment category	weight
Laboratories	18%
Unit exams	10%
Homework	20%
Midterm exam (each)	15%
Final exam	22%

Based on a 100-point scale. Grade ranges are: A = 85-100, B = 72-84, C = 62-71, D = 55-62, F = less than 55.

Materials

- *College Physics* by Giambattista, Richardson, and Richardson.
- A quadrille-ruled notebook for the laboratories.
- A calculator with scientific functions, a ruler, a protractor, and a stapler.

Course Requirements: There are no attendance requirements for the lecture portion, class, but attendance at labs is mandatory. If a student cannot attend his/her regular laboratory session, he/she may attend another one provided there is room. Homework will be regular assigned. There are 5 to 7 quizzes ("unit exams") given on basic concepts. Students must pass every quiz with a 75% or better. Quizzes not passed may be repeated.

Statement on Americans with Disabilities: If you have a documented disability or suspect that you have a learning problem and need accommodations, please contact the Disability Services Program in Loso Hall 234. Telephone: 962-3081

Statement on Academic Misconduct: Eastern Oregon University places a high value upon the integrity of its student scholars. Any student found guilty of an act of academic misconduct (including, but not limited to cheating; plagiarism; or theft of an examination or supplies) may be subject to having his or her grade reduced in the course in question, being placed on probation or suspended from the university, or being expelled from the university -or a combination of these.

See Section II of the Student Handbook and Planning Calendar for clarification.

Syllabus prepared by Tom Herrmann
January 2006.