SUNY College at Cortland
Physics Department
Physics 203 -- Principles of Physics III

Course Information:
Credit Hours: 3 hrs
Semester/Year: Spring
Location: Bowers 154
Texts and Bibliographic Materials Required: *University Physics with Modern Physics*, by Hugh Young and Roger Freedman (Twelfth Edition, Volumes 1 and 2)
Resource Bibliography Upon which Course Is Based: same as above

Professor Information:
Name of Instructor/Professor: Dr. Brice Smith
Phone: 607-753-2822
Office Location: Bowers 143 Lab Location: Bowers 141
Office Hours: MWF 9:00-10:00am and 11:30-12:30pm and by appointment
E-mail: brice.smith@cortland.edu

Course Description: Fundamental principles of thermodynamics, optics, and sound using methods of calculus. Topics include heat, work, and energy of thermodynamics systems, wave motion, geometrical and physical optics, and sound. Three lectures. Prerequisite: PHY 202. (3 cr. hr.)

Course Attendance Policy: Attendance is strongly encouraged, but not mandated.

Rationale/Goals/Objectives of the Course (Stated as Student Outcomes) and How They Reflect Specific Components of Cortland's Conceptual Framework:

Students majoring in Adolescence Education: Physics 7-12 will focus on acquiring knowledge and developing skills aligned with learning outcomes from the College's Conceptual Framework for Teacher Education and those established by the National Science Teachers Association. In particular, this course addresses Conceptual Framework Learning Outcome 2: Possess in-depth knowledge of the subject area to be taught; NSTA Standard I: Content; NSTA; Standard 2: Nature of Science; NSTA Standard 3: Inquiry; NSTA Standard 4: Issues; and NSTA Standard 7: Science in the Community.

Specifically, this course provides students with a detailed examination of the thermodynamic treatment of macroscopic systems. The students will learn how to translate the concepts of conservation of energy into thermodynamic language including such ideas as the mechanical equivalence of heat. The students will be introduced to the historical roots of thermodynamic laws and how technological developments helped to shape our physical understanding of entropy and heat as distinct from earlier ideas based in chemistry. The students will explore the application of thermodynamic laws to the design and functioning of heat pumps, engines, and refrigerators and be able to analyze the efficiency of these systems. The students will also be introduced to the concepts of fluid mechanics including lamellar and turbulent flows. In addition, the course will provide students a detailed examination of the physics of waves and

fields including mechanical waves, sound, and light. The students will learn about linear superposition including constructive and destructive interference. Finally, the students will explore how the rules of wave mechanics as well as those of electricity and magnetism determine the behavior of optical devices such as telescopes, microscopes, and the human eye.

Evaluation of Student Performance

Student Grades will be based on the total points accumulated from the following components:

3 In-class Exams	11 percent each
Final Exam	22 percent
Homework	45 percent

Problem sets will typically be handed out on Wednesday and will be due the following Wednesday when an answer key will be provided. Late problem sets will not generally be accepted. A final curve will be established at the end of the course for the assignment of individual letter grades.

Course Schedule and Activities

Date	Topic	Text
Jan. 24, 26, 28, 31	Temperature and Heat	Chapter 17
Feb. 2, 4, 7	Thermal Properties of Matter	Chapter 18
Feb. 9, 11, 14	The First Law of Thermodynamics	Chapter 19
Feb. 16, 18, 21, 23, 25	The Second Law of Thermodynamics	Chapter 20
Feb. 28	Fluid Mechanics	Chapter 14
Mar. 2	*Exam One*	
Mar. 4, 7, 9	Fluid Mechanics (cont.)	Chapter 14
Mar. 11	Mechanical Waves	Chapter 15
Mar. 14, 16, 18	*Spring Break - No Classes*	
Mar. 21, 23, 25	Mechanical Waves (cont.)	Chapter 15
Mar. 28, 30, Apr. 1	Sound and Hearing	Chapter 16
Apr. 4	The Nature and Propagation of Light	Chapter 33
Apr. 6	*Exam Two*	
Apr. 8, 11	The Nature and Propagation of Light (cont.)	Chapter 33

Apr. 13	Geometric Optics and Optical Instruments	Chapter 34
Apr. 15	*Scholar's Day - No Classes*	
Apr. 18, 20, 22	Geometric Optics and Optical Instruments (cont.)	Chapter 34
Apr. 25, 27	Interference	Chapter 35
Apr. 29	*Exam Three*	
May 2	Interference (cont.)	Chapter 35
May 4, 6, 9	Diffraction	Chapter 36

Disability Statement: SUNY Cortland is committed to upholding and maintaining all aspects of the federal Americans with Disabilities Act of 1990 (ADA) and Section 504 of the Rehabilitation Act of 1973. If you are a student with a disability and wish to request accommodations, please contact the Student Disability Services Office located in B-1, Van Hoesen Hall or call 753-2066 for an appointment. Because many accommodations require early planning, requests for accommodations should be made as soon as possible.

Academic Integrity Statement: "Students in this course are expected to abide by the guidelines on academic dishonesty that are found in chapter 340 of the SUNY Cortland College Handbook (http://www.cortland.edu/president/handbook.pdf). As stated in these guidelines, any instance of plagiarism, cheating on examinations or other forms of academic dishonesty will be punished, most likely by the receipt of a failing grade for this course and possible dismissal from the College. The primary means for enforcing the course's policy on academic dishonesty will be a Web-based plagiarism detection service to which you will be required to submit all of the papers you write for this course.