The course covers the physics of waves and oscillations including sound, elastic, and electromagnetic waves. Topics range from the theory of simple harmonic oscillators, transverse modes of a continuous string, and physical optics including interference, Fresnel and Fraunhofer diffraction, and resolution, to diffraction of X-rays and electrons by crystals.

**Contact Information:**

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Office: PHYS 378  
Phone: 765-496-2464  
Office Hours: T (2PM – 3PM), Th (2PM – 3PM)

**Textbooks:**

A. P. French, *Vibrations and Waves*, Norton  

**Lecture:**

M,W,F 3:30 p.m. – 4:20 p.m.  
Room 112 PHYS  

**Responsibility of the student:**

Attendance at lecture is required. It is assumed that the reading for the class is completed prior to the lecture.

**Homework:**

Homework assignments will be posted in advance in class and on the course webpage and are to be turned in the date they are due. No homework will be accepted late. At most one homework assignment will be dropped when computing the final grade if it is to the student’s advantage.

Homework solutions must include complete, legible explanations of your work. It must be easy for the reader to follow your reasoning. If it takes the grader longer to figure out your reasoning than it took you to write out your solution, something is wrong!
Exams:

There will be a midterm exam during the semester administered in the evening and a final exam during finals week. The final exam will be comprehensive with approximately $\frac{1}{2}$ of the exam on the last section of the course.

Grading:

The final letter grade for the course will be determined based on the following:

- Homework – 30%
- Midterm – 30%
- Final exam – 40%
### Course Schedule (approximate):

<table>
<thead>
<tr>
<th>Week of</th>
<th>Reading</th>
<th>Comments</th>
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| Jan 7ᵗʰ   | Introduction to harmonic motion.  
*French: Chapter 1* |                                    |
| Jan 14ᵗʰ  | Electromagnetic theory I.  
*Hecht: Chapter 3* |                                    |
| Jan 21ᵗʰ  | Electromagnetic theory II.  
*Hecht: Chapter 3* | No class Monday  
(MLK jr. Day) |
| Mar 28ᵗʰ  | Superposition of harmonic waves.  
*French: Chapter 2, Hecht: Chapter 7* |                                    |
| Feb 4ᵗʰ   | Free vibrations of physical systems.  
*French: Chapter 3* |                                    |
| Feb 11ᵗʰ  | Forced vibrations of physical systems, resonance.  
*French: Chapter 4* |                                    |
| Feb 18ᵗʰ  | Coupled oscillators and normal modes.  
*French: Chapter 5* |                                    |
| Feb 25ᵗʰ  | Normal modes of continuous systems, Fourier analysis.  
*French: Chapter 6, Hecht: Chapter 11* |                                    |
| Mar 4ᵗʰ   | Progressive waves.  
*French: Chapter 7* | Midterm exam                       |
| Mar 11ᵗʰ  | Spring break | No classes                         |
| Mar 18ᵗʰ  | Propagation of light.  
*French: Chapter 8, Hecht: Chapter 4* |                                    |
| Mar 25ᵗʰ  | Geometric optics I.  
*French: Chapter 8, Hecht: Chapter 5* |                                    |
| Apr 1ᵗʰ   | Geometric optics II.  
*French: Chapter 8, Hecht: Chapter 6* |                                    |
| Apr 8ᵗʰ   | Polarization.  
*French: Chapter 8, Hecht: Chapter 8* |                                    |
| Apr 15ᵗʰ  | Interference.  
*French: Chapter 8, Hecht: Chapter 9* |                                    |
| Apr 22ⁿᵈ  | Diffraction.  
*French: Chapter 8, Hecht: Chapter 10* |                                    |
| Apr 29ᵗʰ  | Final exam                                       |                                    |