

Physics 116: Waves, Optics, Atoms and Nuclei

Overview

Phys 116 is the third course of a three-quarter course sequence of introductory physics courses targeted for students in life sciences. Upon successful completion of this course, a student will be able to develop algebra-based models to describe the physical world pertaining to oscillatory motion, sound, geometrical and physical optics, and modern physics. Additionally, students will be able to apply these physics concepts to other fields of science and everyday phenomena. The course consists of lecture (3 per week) and tutorial (Tuesday from 5pm to 6pm) components.

Textbook

- *College Physics a strategic approach*, Knight Field Jones (Pearson, 4th edition, 2018)

Lecture Topics (Textbook chapters)

- **Ch. 14 (4 lectures):** Simple harmonic oscillators
- **Ch. 15 (4 lectures):** Traveling waves, wave model, Doppler effect
- **Ch. 16 (3 lectures):** Superposition of waves, standing waves, two source interference
- **Ch. 17 (3 lectures):** Physical optics
- **Ch. 18 (3 lectures):** Geometrical optics
- **Ch. 19 (2 lectures):** Human eyes & optical instruments
- **Ch. 25 (1 lectures):** Electromagnetic waves & polarization
- **Ch. 28 (2 lectures):** Quantum physics
- **Ch. 29 (2 lectures):** Atomic physics
- **Ch. 30 (3 lectures):** Nuclear physics

Tutorial Topics (7 or 8 of the following)

- Simple harmonic motion
- Damped oscillations
- Superposition and reflection
- Reflection and transmission
- Two source interference
- Convex lenses
- Photoelectric effect
- Wave-particle duality
- Spectroscopy

Evaluation

The grades are calculated based on the following contributions and based on the scale below.

- **Continuous Assessment (40% overall)**
 - **Pre-lecture Reading Quiz Scores: 25%**
 - **Lecture Questions: 10%**
 - **Tutorial Pre-tests: 5%**
- **Exam Assessment (60% overall)**
 - The exam score will be based on the best of the following two methods:
 - Method 1: 40% of the exam score comes from the average of two midterm exams and 20% from your final exam
 - Method 2: 20% of the exam score comes from your best midterm and 40% from your final exam

The following grading scale will be applied to calculate student's final grade. The grade points and their corresponding final course scores are shown below.

grade point	final course score	grade point	final course score	grade point	final course score	grade point	final course score
4.0	93	3.0	78	2.0	63	1.0	48
3.9	91.5	2.9	76.5	1.9	61.5	0.9	46.3
3.8	90	2.8	75	1.8	60	0.8	44.6
3.7	88.5	2.7	73.5	1.7	58.5	0.7	42.9
3.6	87	2.6	72	1.6	57		
3.5	85.5	2.5	70.5	1.5	55.5		
3.4	84	2.4	69	1.4	54		
3.3	82.5	2.3	67.5	1.3	52.5		
3.2	81	2.2	66	1.2	51		
3.1	79.5	2.1	64.5	1.1	49.5		