NS 544 Concepts in Physics V: Waves and Geometric Optics
Course Schedule

N.B.: The schedule below has not yet been adapted to the blended schedule of online and in-class meetings. Course readings may vary between course offerings.

Session 1: Harmonic Motion.
Readings from Cutnell & Johnson: 10.1 – 10.3, 10.9
Laboratory experiment: Simple Harmonic Motion
Waves and Optics Pre-Tests

ONLINE Session 2: Springs; Pendulums.
Readings from Cutnell & Johnson: 10.4 – 10.6
Web assignment 1
Reading assignment for online sessions 2 and 3:

Session 3: Waves on Strings.
Readings from Cutnell & Johnson: 16.1 – 16.3

ONLINE Session 4: Transverse and Longitudinal Waves
Readings from Cutnell & Johnson: 16.4 – 16.6
Web assignment 2
Reading assignment for online sessions 4 and 5:

Session 5: Waves in Air Columns -- Sound.
Readings from Cutnell & Johnson: 17.1 – 17.8
Laboratory experiment: Sound
Philosophy/History/Education Research: A critical appraisal of Galileo’s account of pendulum motion including Matthews discussion.
Home Project Due: Pendula or other oscillators.

ONLINE Session 6: Doppler effect
Readings from Cutnell & Johnson: 16.7 – 16.10
Web assignment 3
Reading assignment for online sessions 6 and 7:
Session 7: Midterm Test
   Midterm test on Harmonic Motion and Waves
   Philosophy/History/Education Research: Discussion of Chi’s ontological categories and Wittmann’s object analysis of students’ misconceptions.

ONLINE   Session 8: Reflection, spherical mirrors, ray diagrams.
   Readings from Cutnell & Johnson: Chapter 25
   Web assignment 4
   Computer-Based Activities: Virtual optical bench.
   Reading assignment for online sessions 8 and 9:

Session 9: Refraction and total internal reflection.
   Readings from Cutnell & Johnson: 26.1 – 26.5
   Laboratory experiment: Geometrical optics.
   Philosophy/History/Education Research: Discussion of misconceptions literature on optics.

ONLINE   Session 10: Lenses and ray diagrams.
   Readings from Cutnell & Johnson: 26.6 – 26.9
   Web assignment 5

Session 11: Optical instruments.
   Readings from Cutnell & Johnson: 26.9 – 26.10, 26.15
   Take home exam handed out
   Applications: The human eye and the camera.
   Home Project Due: Home made telescope or microscope.

ONLINE   Session 12: Light, color, and shadows.
   Readings from Cutnell & Johnson: 26.11 – 26.14
   Applications: Rods and cones in the human eye.

Session 13: Review of Light
   Waves and Optics Post-tests.

Session 14: Wrap-up
   Student presentations.
   Take home exam due
Bibliography

Selections from primary sources
This text is now available online from http://books.google.com/books?q=Galileo+Two+New+Sciences&btnG=Search+Books

Selections from secondary sources

Selections from Education Research Literature


