NS 549 Everyday Applications of Physics
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: Seesaws.
Review of rotational inertia, torque, angular velocity, angular acceleration, Newton's first and second laws of rotation, center of mass, and levers.
Readings from Chapter 2 of How Things Work
Assignment: Selected questions from chapter 2

Reading assignment for next Friday:

Session 2: Carousels and Roller Coasters.
Review of uniform circular motion and centripetal acceleration.
Readings from Chapter 3 of How Things Work
Philosophy/History/Education Research: Overview of the recent history of ideas on science teaching and learning methods.
Assignment: Selected questions from chapter 3

Session 3: Bicycles
Review of unstable equilibrium, static and dynamic stability, and precession)
Readings from Chapter 4 of How Things Work
Assignment: Selected questions from chapter 4

Reading assignment for next Friday:

Session 4: Rockets and Space Travel
Review of reaction forces, Newton's law of gravitation, elliptical orbits, Kepler’s laws, special and general relativity, and the equivalence principle.
Readings from Chapter 4 of How Things Work
Philosophy/History/Education Research: Controversies on inquired-based learning vs. non-inquiry based learning. I
Assignment: Selected questions from chapter 4

Session 5: Airplanes
Review of streamlining, lifting wing, angle of attack, induced drag, stalled wing, and thrust.
Readings from Chapter 6 of How Things Work
Assignment: Selected questions from chapter 6
Reading assignment for next Friday:


Session 6: Air Conditioners

Review of the laws of thermodynamics, temperature, heat, entropy, heat pumps and thermodynamic efficiency

*Readings from Chapter 8 of How Things Work*

*Philosophy/History/Education Research:* Controversies on inquired-based learning vs. non-inquiry based learning II: examining experimental data

*Assignment:* Selected questions from chapter 8

Session 7: Automobiles.

Review of heat engines and thermodynamic efficiency.

*Readings from Chapter 8 of How Things Work*

*Assignment:* Selected questions from chapter 8

Reading assignment for next Friday:


Session 8: Clocks

Review of time and space, natural resonance, harmonic oscillators, simple harmonic motion, frequency.

*Readings from Chapter 9 of How Things Work*

*Philosophy/History/Education Research:* Kuhn on learning physics.

*Assignment:* Selected questions from chapter 9

Session 9: Xerographic copiers.

Review of electric fields and voltage gradients, relationships between shape and field, discharges, electric current, direction of current flow, charging by induction.

*Readings from Chapter 10 of How Things Work*

*Assignment:* Selected questions from chapter 10

Session 10: Project Presentations.

Session 11: Project Presentations.

Session 12: Project Presentations.

Session 13: Final Examination.
Selections from Science Education Research Literature


