Class Schedule and Assignments

Unit 4: Gravitation

- December 1, Monday — Return Exams

- December 3, Wednesday — **Topic: Kepler and Newton's Law of Gravitation**
  Read: 8-1 through 8-3
  Assigned Problems: CH 8: 13, 15, 17, 19, 21, 35, 39, 41, 61

- December 4, Thursday — **Topic: Gravitational Energy and Fields**
  Read: 8-4 & 8-5; Gravitational Field Integrals handout
  Assigned Problems: A64, Problem C, Problem D (see below);
  CH 18: 27, 29, 31, 53, 65

- December 5, Friday — **Topic: Problem Session**

- December 8, Monday — **Topic: Curved Space and Gravity**
  Read: Supplementary Reading CH 6
  Assigned Problems: A65; **Supp CH 6:** 1, 2, 3

- December 11, Thursday — **FINAL EXAM, 11:45 am**

Hand-In Problems

1. Due Monday, December 8, 4:30 pm
   A62, A63, Problem E, Problem F (see below); **CH 8:** 16, 20, 26, 32, 38, 44
   NOTE: For **CH 8 #26**, "how much energy" means "how much kinetic energy"

Problem C: (a) Calculate the magnitude g of the Earth's gravitational field at the location of the Moon. (b) Use your result from part (a) to calculate the gravitational force of the Earth on the Moon. (c) Use your result from part (a) to calculate the gravitational force of the *Earth* on a 70 kg astronaut standing on the surface of the Moon.

Problem D: A rod lies on the x-axis with one end at $x = L_1$ and the other end at $x = L_2$. The rod is not uniform, and its mass per unit length varies as $\lambda = Cx$, where C is a constant. (a) Determine the total mass of the rod. (b) Find the gravitational field at the origin due to the rod.

Problem E: Determine the magnitude g of the gravitational field (a) on the surface of the Moon, (b) at a point 2000 km above the Earth's surface.

Problem F: A uniform rod of mass M and length L lies along the x-axis with its center at the origin. Determine the gravitational field at the point $x = d$, where $d > L/2$.