PHYS 410 Schedule – Spring 2011 (version 2)

Mon Jan 24		Chapter 1: Newton's Laws of Motion	Conceptual review
Wed Jan 26			Mathematical review: vector equations, etc.
Fri Jan 28			Drag; Numerical solutions workshop
Mon Jan 31		Chapter 2: Projectiles & Charged Particles	Analytic solutions for projectile motion
Wed Feb 2	HW 1		Charged particle in B and E fields
Fri Feb 4		Chapter 3: Momentum & Angular Momentum	Mathematical basis; rockets; angular momentum and moment of inertia
Mon Feb 7			Impulse, work, kinetic and potential energy
Wed Feb 9	HW 2	Chapter 4: Energy	Potential energy functions and what they're good for
Fri Feb 11			Energy conservation and applications; damped oscillators
Mon Feb 14		Chapter 5: Oscillations	Driven damped oscillators; resonance
Wed Feb 16	HW 3		Frequency domain analysis and applications
Fri Feb 18		Chapter 9: Mechanics in Noninertial Frames	Apparent forces in accelerating and rotating reference frames
Mon Feb 21			Tides
Wed Feb 23	HW 4	Review and discussion	
Fri Feb 25		Exam	
Mon Feb 28		Chapter 6: Calculus of Variations	Euler-Lagrange equation
Wed Mar 2			The brachistochrone
Fri Mar 4	HW 5	Chapter 7: Lagrange's Equations	Lagrange's equations; basic applications
Mon Mar 7			More applications of Lagrange's equations
Wed Mar 9			Lagrangian problem-solving workshop
Fri Mar 11	HW 6		Dealing with constraints; conservation laws
Mon Mar 14		Chapter 8: Two-body Central Force Problems	Equivalent one-dimensional problem
Wed Mar 16			Conservation of angular momentum and energy
Fri Mar 18	HW 7		All about orbits
Spring Break			
Mon Mar 28		Chapter 14: Collision Theory	Impact parameter and scattering angle
Wed Mar 30	HW 8		Total and differential cross sections
Fri Apr 1			Rutherford scattering; Hamilton's equations
Mon Apr 4		Chapter 13: Hamiltonian Mech.	Applications of Hamiltonian mechanics
Wed Apr 6	HW 9	Review and discussion	
Fri Apr 8		Exam	
Mon Apr 11		Chapter 10: Rotational Motion of Rigid Bodies	Total angular momentum; rotation about a fixed axis
Wed Apr 13			The moment-of-inertia tensor
Fri Apr 15			Principal axes; precession of a top; free precession
Mon Apr 18	HW 10	Chapter 11: Coupled Oscillators	Linear examples; normal modes
Wed Apr 20			The double pendulum and other applications
Fri Apr 22		Chapter 12: Nonlinear Mechanics & Chaos	Period doubling; chaos, and how we can characterize it
Mon Apr 25	HW 11		State-space orbits and Poincaré sections
Wed Apr 27		Chapter 15: Relativity	Postulates; time dilation; length contraction
Fri Apr 29			Spacetime diagrams; the Lorentz transformation; four-vectors and their properties
Mon May 2	HW 12		Relativistic momentum and energy
Wed May 4			Particle interactions and decays
Fri May 6			Tensors and the spacetime metric; electrodynamics and relativity
Mon May 9	HW 13	Review and discussion	
Final exam: take-home, 24 hour period, Time window TBD			