Physics 609
Syllabus

8/21/2007

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Office hours: Call to make sure I am in, TTH afternoons to 4:00pm and MWF all day till to 3:15pm. We'll refine this as we settle into schedules. I check e-mail regularly.

Text: *Theoretical Mechanics of Particles and Continua,* Fetter and Walecka, Dover (2004)

Grading:

3	Tests
2	Homework and Pop Tests
2	Final
7	

100-87.5	A
87.5-75	B
75-62.5	C
62.5-50	D
<50	F

Academic Regulations:

Regular attendance is expected. Every class is important. Please do not come late. Homework is to be turned in at the beginning of class.

The syllabus below is subject to change to accommodate instruction and/or student needs.

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Goal:

To develop an understanding of Classical Mechanics of particles and to develop your math skills as applied to physics.

Chapter 1: Implications of Newton's Laws.
Chapter 2: Accelerated coordinate systems - Coriolis forces.
Chapter 3: Lagrangian dynamics - how to work impossible mechanics problems easily
Chapter 4: Normal modes of particles - analysis of any small oscillations around equilibrium.
Chapter 5: Rigid body rotation - tools to calculate behavior of tops etc.
Chapter 6: Hamiltonian dynamics - abstract C.M. leading to Q.M. - good base for QM study.

Expectations:

You are expected to read the text material before class and after class. It is expected that you will be able to reproduce any derivation presented on tests and the exam. I highly recommend that you take notes in class and annotate or recopy these notes after class so that you can use these notes to study. Some of the homework problems are difficult. You should start working on the problems early so that if you need to read other texts or go to the library you will have time to do so.

Date	Chapter	Homework Due
August 21	1.1, 1.2 Newton's laws, Systems of particles	
August 23	1.2, 1.3 Systems of particles, Central forces	
August 28	1.3 Central forces	211 test worked
August 30	1.4, 1.5 Two body motion, Scattering	
September 4	1.5 Scattering	1.2, 1.3, 1.4, 1.7
September 6	2.6, 2.7, 2.8, 2.9, 2.10 Accelerated reference frames	
September 11	2.11, 2.12 Motion,on earth's surface,Foucault pendulum	1.11, 1.13, 1.17, 1.18 a,b
September 13	3.13, 3.14, 3.15 D'Alembert's principle, Lagrange Eq.	
September 18	3.16, 3.17 Examples, Calculus of variation	2.1a, 2.4, 2.5
September 20	3.18, 3.19 Hamilton's principle, Forces of constraint	
September 25	**Test on Chapters 1 and 2.**	**Test 1**
September 27	3.19, 3.20 Forces of constraint, Generalized momenta	
October 1	**Last day to withdraw**	
October 2	4.21, 4.22 Small oscillations, Normal modes	3.1, 3.4, 3.7
October 4	4.22 Normal modes	
October 9	4.23 Examples	3.10, 3.13, 3.15
October 11	Gram Schmidt, more examples, 5.26 Rigid body theory	
October 16	5.26- 5.28 Rigid body theory, Euler's Equations, Applications	4.1, 4.3, 4.9a
October 18	5.28 Kater's pendulum, Billiard ball, Asymmetric top	G6.1, G6.8 from Goldstein
October 23	5.30, 5.31 Euler angles, Heavy symmetric top	
October 25	Test 2, Chapters 3 and 4	**Test 2**
October 30	5.31 Heavy symmetric top	5.1, 5.3, 5.5, 5.8
November 1	6.32, 6.33 Hamilton's equations, Particle in E&M field	
November 6	6.34, 6.35 Canonical transformations, Hamilton Jacobi theory	6.2, 6.3, 6.4
November 8	6.35, 6.36 H-J Theory, Poisson Brackets	
November 13	6.36, 6.37 Action Angle variables, Transition to QM	6.10, 6.11, 6.12
November 15	**Test 3, Chapters 5 and 6**	**Test 3**
November 19-23	Thanksgiving vacation	
November 28	6.37 Transition to Quantum mechanics	
November 30	Independent study (no class)	
December 4	**Final Exam (8:00am Tuesday)**	