Physics 609
Syllabus

8/23/2005

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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 22	1.1, 1.2 Newton's laws, Systems of particles	
August 24	1.2, 1.3 Systems of particles, Central forces	
August 29	1.3 Central forces	211 test worked
August 31	1.4, 1.5 Two body motion, Scattering	
September 5	1.5 Scattering 2.6, 2.7 Rotating coordinate systems	1.1, 1.2, 1.4, 1.8
September 7	2.6, 2.7, 2.8, 2.9, 2.10, 2.11 Coriolis force, Examples	
September 12	2.12 Foucault pendulum, 3.13 Constraints	1.9, 1.13, 1.16, 1.18 a,b
September 14	3.13, 3.14, 3.15, 3.16, 3.17 D'Alembert's principle, Lagrange Eq.	
September 19	3.17, 3.18, 3.19 Calculus of variation, Hamilton's Principle	2.1a, 2.5, 2.6
September 21	3.19 Hamilton's principle, Forces of constraint	
September 26	**Test on Chapters 1 and 2.**	**Test 1**
September 28	3.20, 4.21 Generalized momenta, Small oscillations.	
October 2	**Last day to withdraw**	
October 3	4.22 Normal modes	3.2, 3.5, 3.8
October 5	4.22, 4.23 Normal mode, examples	
October 10	5.26 Rigid body theory	3.10, 3.13, 3.18
October 12	5.27, 5.28 Kater's pendulum, Billiard ball	Read Problem 4.5
October 17	5.28, 5.29 Symmetric top, Euler angles	4.1, 4.4, 4.9a
October 19	5.30, 5.31 Symmetric heavy top	
October 24	**Test 2, Chapters 3 and 4**	**Test 2**
October 26	Independent study (no class)	
October 31	6.32, 6.33 Hamilton's equations, Particle in E&M field	5.1, 5.4, 5.6, 5.8
November 2	6.34, 6.35 Canonical transformations, Hamilton Jacobi theory	
November 7	6.35, 6.36 H-J Theory, Poisson Brackets	6.1, 6.3, 6.6
November 9	6.36, 6.37 Action Angle variables, Transition to QM	
November 14	6.37 Transition to Quantum mechanics	6.10, 6.12
November 16	**Test 3, Chapters 5 and 6**	**Test 3**
November 20-24	Thanksgiving vacation	
November 28	Independent study (no class)	
November 30	Independent study (no class)	
December 5	**Final Exam (8:00am Tuesday)**	