Physics 609
Syllabus

8/25/2009

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Office hours: Call to make sure I am in, TH 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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Goals:

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. The problems in this course are similar to and often derived from research problems. Solving these will develop your ability to do independent research. 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. The text contains references to key papers in mechanics. It is good practice to look these references up to gain further insight into the material and to the historical development of the field.

Note:
There is an Acoustical Society Meeting the week of October 26 - 30. I am not sure what my schedule will be that week.

Date	Chapter	Homework Due
August 25	1.1, 1.2 Newton's laws, Systems of particles	
August 27	1.2, 1.3 Systems of particles, Central forces	
September 1	1.3 Central forces	211 test worked
September 3	1.4, 1.5 Two body motion, Scattering	
September 8	1.5 Scattering	1.3, 1.5, 1.7
September 10	Problems with changing mass	
September 15	2.6, 2.7, 2.8, 2.9, 2.10 Accelerated reference frames	
September 17	2.11, 2.12 Motion,on earth's surface,Foucault pendulum	1.9, 1.11, 1.14, 1.17
September 22	3.13, 3.14, 3.15 D'Alembert's principle, Lagrange Eq.	
September 24	3.16, 3.17 Examples, Calculus of variation	2.3, 2.5, 2.6
September 29	3.18, 3.19 Hamilton's principle, Forces of constraint	
October 1	**Test on Chapters 1 and 2.**	**Test 1**
October 5	**Last day to withdraw**	
October 6	3.19, 3.20 Forces of constraint, Generalized momenta	
October 8	4.21, 4.22 Small oscillations, Normal modes	3.2, 3.6, 3.9
October 13	4.22 Normal modes	
October 15	4.23 Examples	3.10, 3.16, 3.17
October 20	Gram Schmidt, more examples, 5.26 Rigid body theory	
October 22	5.26- 5.28 Rigid body theory, Euler's Equations, Applications	4.1, 4.8, 4.9a
October 27	5.28 Kater's pendulum, Billiard ball, Asymmetric top	G6.1 from Goldstein
October 29	5.30, 5.31 Euler angles, Heavy symmetric top	
November 3	5.31 Heavy symmetric top	
November 5	**Test 2, Chapters 3 and 4**	**Test 2**
November 10	6.32, 6.33 Hamilton's equations, Particle in E&M field	5.1, 5.3, 5.5, 5.9
November 12	6.34, 6.35 Canonical transformations, Hamilton Jacobi theory	
November 17	6.35, 6.36 H-J Theory, Poisson Brackets	
November 19	6.36, 6.37 Action Angle variables, Transition to QM	6.2, 6.4, 6.5
November 23-27	Thanksgiving vacation	
November 30	Turn problems in to Physics office by 1:00pm	6.9, 6.10, 6.15
December 1	6.37 Transition to QM	
December 3	**Test 3, Chapters 5 and 6**	**Test 3**
December 8	**Final Exam (8:00am Tuesday)**	