Physics 609
Syllabus

1/25/2011

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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.

University of Mississippi Creed:

The University of Mississippi is a community of learning dedicated to nurturing excellence in intellectual inquiry and personal character in an open and diverse environment. As a voluntary member of this community:

I believe in respect for the dignity of each person

I believe in fairness and civility

I believe in personal and professional integrity

I believe in academic honesty

I believe in academic freedom

I believe in good stewardship of our resources

I pledge to uphold these values and encourage others to follow my example.

Date	Chapter	Homework Due
January 25	1.1, 1.2 Newton's laws, Systems of particles	
January 27	1.2, 1.3 Systems of particles, Central forces	
February 1	1.3 Central forces	211 test worked
February 3	1.4, 1.5 Two body motion, Scattering	
February 8	1.5 Scattering	1.3, 1.4, 1.5b, 1.7,1.8
February 10	2.6, 2.7, 2.8, 2.9, 2.10 Accelerated reference frames	
February 15	2.11, 2.12 Motion,on earth's surface,Foucault pendulum	1.9, 1.16, 1.17
February 17	3.13, 3.14, 3.15 D'Alembert's principle, Lagrange Eq.	
February 22	3.16, 3.17 Examples, Calculus of variation	2.3, 2.4, 2.6
February 24	3.18, 3.19 Hamilton's principle, Forces of constraint	
March 1	**Test on Chapters 1 and 2.**	**Test 1**
March 3	3.19, 3.20 Forces of constraint, Generalized momenta	
March 4	**Last day to withdraw**	
March 8	4.21, 4.22 Small oscillations, Normal modes	3.1, 3.3, 3.8
March 10	4.22 Normal modes	
March 22	4.23 Examples	3.10, 3.13, 3.17
March 24	Gram Schmidt, more examples, 5.26 Rigid body theory	
March 29	5.26- 5.28 Rigid body theory, Euler's Equations, Applications	4.1, 4.3, 4.5, 4.9a
April 5	5.28 Kater's pendulum, Billiard ball, Asymmetric top	G6.1 from Goldstein
April 7	5.30, 5.31 Euler angles, Heavy symmetric top	
April 12	5.31 Heavy symmetric top	
April 14	**Test 2, Chapters 3 and 4**	**Test 2**
April19	6.32, 6.33 Hamilton's equations, Particle in E&M field	5.1, 5.4, 5.5, 5.10
April 21	6.34, 6.35 Canonical transformations, Hamilton Jacobi theory	
April 26	6.35, 6.36 H-J Theory, Poisson Brackets	6.2, 6.3, 6.4, 6.7
April 28	6.36, 6.37 Action Angle variables, Transition to QM	
May 3	**Test 3, Chapters 5 and 6**	**Test 3**
May 5	6.37 Transition to Quantum mechanics	
May 10	**Final Exam (8:00am Tuesday)**	