Physics 312: Classical Mechanics  
Spring 2007  

Instructor: James R. Thompson  
Office: 406-A Nielsen Physics Building  
Phone: 974-7837 [or 574-0412 at ORNL on Tues & Thur]  
Class: 09:05 - 09:55 M-W-F in Nielsen Physics 306  
Office Hrs: 10:00 - 11:30 Mon & Fri (if this does not work, then before class or by appointment.)  

Texts:  
U *Classical Dynamics of Particles and Systems, 5-th Ed* by S.T. Thornton and J.B. Marion  
U *Matlab Guide* by D.J. Higham and N.J. Higham  
*Getting Started with MATLAB* by Rudra Pratap  

Tests and Grades:  
Two hour tests  50%  
Homework  25%  
Comprehensive exam  25%  

Any request for review or appeal of the grading of test papers, homework, etc. must be made *within one week* of the time that they are returned to the class. After that time, the scores become permanent.  

Grading scale: A = 100-89; B = 89-78; C = 78-67; D = 67-56; and F = <56.  

Class preparation and protocol:  
As you now must realize, it is very important to *keep up* with the work, since the material builds on itself. Each day, *preview* the topics for the next class; after class, *study* the topics in detail and *work* the assigned exercises. *Ask questions* and *participate!*  

Communication and Computing:  
We’ll use email for communication and confirming assignments, so please give me an operational email address and check the account regularly. Also, I’ll post class notes and more on the web at http://www.phys.utk.edu/courses/mechanics/ . Learning some numerical methods – a key component of current physics – is an important part the class. We’ll continue using MATLAB, which is available on some departmental PCs in Nielsen 203 and elsewhere. (Optional: a student version of MATLAB is available for ~$100 at the Computer Store).  

Cheating:  
Cheating will not be tolerated – everyone must have an equal chance to do well. The penalty for cheating on *any aspect* of this course will be an “F” for the course. No outside materials are permitted on any test or exam, except those specified in writing by the instructor.  

Tests:  
Test I:  
Test II:  
Exam: 7 May 2006 (Monday) at 8:00 - 10:00  

Ch: §  Topic  
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6  Calculus of Variations (continued)  
7  Lagrangian & Hamiltonian Dynamics  
8  Motion with Central Force  
9  Dynamics of a System  
10  Rotating Coordinate Systems  
11  Rigid Body Dynamics  
14  Special Relativity  

Exercises and Problems:  
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set 1: # 2, 4, 5, 7  
set 2: # 2, 4, 7, 10  
set 3: # 22, 24, 25, 26, 28  
set 4: # 3, 10, 14, 17, 19  
set 5: # 2, 6, 10, 23, 28  
set 6: # 30, 33 (w/ MATLAB plots), 44, 54, 57, 59  
set 7: # 2, 8, 9, 12  
set 8: # 1, 4, 13 (MATLAB), 16, 20  
set 9: # TBA  

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COURSE OBJECTIVES

- Gain deeper understanding of classical mechanics and special relativity.
- Develop more generalized approach to Mechanics, e.g., as in Lagrangian methods.
- Advance your skills and capability for formulating and solving problems.
- Develop some capabilities for numerical methods, to obtain solutions to problems too difficult or impossible to solve analytically.
- Hone your math skills.
- Expand and exercise your physical intuition and instincts.