Syllabus - Fall 2012
Physics 303 – Classical Mechanics

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Office Hours: MWF 9:30-10:20 AM
MF 1:30-2:30 PM
Or by appointment

Web: www.physics.gmu.edu/~roerter/phys303/phys303.html

Username (for homework solutions): phys303 Password: [See instructor]

Textbook: *Classical Mechanics*, John R. Taylor

Week	**Topics**	**Reading Assignment**	**Exams**
8/27	Newton's Laws, Vectors in 3-D	1.1-1.7	
9/3	Drag forces, Taylor series	2.1-2.3	
9/10	Varying Forces, Complex numbers	2.4-2.7	
9/17	Conservation of Momentum, Angular momentum	3.1-3.5	
9/24	Conservation of Energy	4.1-4.5	9/28, Chs. 1-3
10/1	Potential Energy, Spherical Polar Coordinates	4.6-4.9	
10/8	Harmonic Oscillator, Small Oscillations	5.1-5.3	Monday classes meet on Tuesday
10/15	Damped and Forced Oscillations	5.4-5.6	
10/22	Lagrange's Equations, Part 1	6.2, 7.1-7.3	10/28, Chs. 4-5
10/29	Lagrange's Equations, Part 2	7.4-7.8	
11/5	Gravitation and Kepler's Laws	8.1-8.4	
11/12	Gravitation and Kepler's Laws	8.5-8.7	11/16, Ch 7
11/19	Noninertial Frames and Fictitious Forces	9.1-9.5	Thanksgiving
11/26	Noninertial Frames and Fictitious Forces	9.6-9.10	
12/3	Noninertial Frames and Fictitious Forces	9.6-9.10	
			Chs. 8-9 12/14 10:30 AM

Goals: Basic concepts of classical physics, solving advanced problems using Newton's Laws of motion, working with forces that vary in time and space, Lagrangian formulation of mechanics, applications to the gravitational problem, working in non-inertial reference frames. Learn how to solve problems using cylindrical and spherical polar coordinates.

Grades:	Homework	25%
	Class Participation	10%
	3 Midterms @15%	45%
	Final Exam	20%

Homework: Students are encouraged to work on the homework together; however, the work you turn in must be your own. *Simply copying someone else's solution is not acceptable and will be considered an Honor Code violation.* It is OK to check your answer using Maple or Mathematica, but your submitted homework must show all the steps worked out by hand.

Remember that it is your responsibility to make your method of solution clear to the grader. If I can't follow your steps, I will deduct points. When in doubt, include extra steps!

Use of any solution manual, internet solutions/advice, or solutions from previous years will be treated as a violation of the honor code.

If you are a student with a disability and you need academic accommodations, please see me and contact the Office of Disability Resources at 703/993-2474. All academic accommodations must be arranged through that office.

Format for Proofs/Problems

1. Define all symbols being used, using words and/or diagrams. (E.g., "Let $\vec{r}$ be the position of a point on the rim of the flywheel, taking the center of the flywheel as the origin.")

2. State your starting point clearly. (E.g., "Starting with $\vec{r} = r\hat{e}_r$, take the derivative with respect to time....")

3. Show **all** algebra, explaining what equations are being used at each step (you may need to label your equations for easy reference). Note that page after page of equation after equation without explanatory remarks at appropriate places is **not** acceptable. Show how integrals were performed unless given in text or otherwise specified.

4. State the final result clearly.

Tips for problem-solving

1. **Break it down** - Break down a problem into smaller problems, then tackle the pieces one at a time.

2. **Work from both ends** - Ask yourself "what do I need to get the desired final result?"

3. If you can't solve, **make an approximation** and try again.

4. **Put it aside** and try again later from scratch.