**SYLLABUS**

Physics 330 - Classical Mechanics (CRN/Section: 3816/101)

Time: MWF 1:00-1:50 PM Fall 2014

Location: S281

**Instructor**

Thomas E. Wilson, Ph.D.

Office: S153

Lab: S154

Phone: 696-2752

Email: wilsont@marshall.edu

**Office Hours**

MWF 3:00-4:00 pm, or by appointment.

**Overview**

The level of the course will be aimed at students who have completed the introductory calculus-based physics sequence. There is much to learn in a first course in classical mechanics. Be forewarned - many of the assigned problems are quite challenging so plan to invest a minimum of ten hours per week for these. The content of chapters 6, and 7 particularly the Hamiltonian formulation of mechanics forms the foundation for quantum mechanics.

**Attendance**

Attendance of all class meetings is expected, but allowance will be made for extenuating circumstances. Students are responsible for material presented in lecture, whether they are in attendance or not.

**Special Needs**

Students with special needs (as documented by the Office of Disability Services) should identify themselves at the beginning of the semester. Every effort will be made to accommodate the special needs of these students

**Academic Integrity**

Complete information on the academic integrity policy can be obtained from the Dean of Students. For general university policies: <http://muwww-new.marshall.edu/academic-affairs/policies/>

**Withdrawal**

Students may withdraw from the course with no record by 4 pm Friday, August 30tmat the Registrar’s office. Students may withdraw from the course and receive a W on their transcript before November 1. Students who are considering withdrawing from the course are encouraged to discuss their standing with me first.

**Text**

The text for the course is Classical Dynamics of Particles and Systems, 5th ed., by Thornton and Marion, Thomson Brooks/Cole Publishing. Most of the assigned reading will be drawn from the text, with some ancillary material taken from other sources.

**Grade Determination**:

All Exam will count 25% of one’s course grade

Overall Course Average: A = 90% or above, B=80% or above, C=70% or above, D=60% or above, F=less than 60%

**Problem Assignments**

Problems will be assigned weekly from the ends of the associated chapters, but there may be additional problems based on material discussed in class. The assigned problems will not be graded, but I will discuss selected solutions in class.

**Exam Schedule**

Exam I: September 15

Exam II: October 13

Exam III: November 10

Final Exam: December 12 (12:45 PM-2:45 PM)

**Topics Covered**

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| We will cover the following chapters of the text. | |
| 1. | Math Review |
|  | Scalars Coordinate transformations  Scalar operations  Vector operations |
| 2. | Newtonian Mechanics – Single Particle |
|  | Newton’s Laws  Frames of reference  Equation of motion  Conservation theorems |
| 3. | Oscillations |
|  | Simple Harmonic Oscillator  Damped oscillations  Sinusoidal driving forces  Superposition – Fourier series |
| 5. | Gravitation |
|  | Gravitational potential  Lines of force and equipotential surfaces  Ocean tides |
| 6. | Calculus of Variations |
| 7. | Hamilton’s Principle – Lagrangian and Hamiltonian Mechanics |
|  | Generalized coordinates  Lagrange’s equation  Lagrange’s equation with undetermined multipliers  Conservation theorems  Hamiltonian dynamics |

8 (time permitting) Central Force Motion

Reduced mass

Conservation theorems

Orbits

Effective potential

Planetary motion