**SYLLABUS**

**Physics 330 - Classical Mechanics (CRN/Section: 3885/101)**

Time: TTR 11:00-12:15 PM Fall 2017

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**

With the exception of contributed discussions with your classmates (see HERD Hours), you not allowed to access and use solutions to the assigned homework problems from any other person or website. Specifically, all materials used in this class (in any form, electronic, printed, or verbal), including, but not limited to, exams, quizzes, handouts, lectures, homework assignments, and all material on the university’s learning management system (currently Blackboard) and its peripherals, are copyright protected works under US Code Title 17.

1. Unauthorized copying, distribution, recording, selling, or posting of any portion of class materials, in any form, in any way, is a violation of federal law; this specifically includes posting any portion of the class materials to the World Wide Web through the Internet, and/or via any other means of electronic communication.
2. Unauthorized sharing of class materials in any form, specifically including, but not limited to, uploading class materials to websites for the purpose of seeking/providing solutions or sharing those materials with current or future students is a violation of the Academic Dishonesty Policy set forth in Marshall University's Student Code of Conduct.

'Unauthorized' means without explicit permission from the instructor.

Violation of (1) or (2) will result in all necessary disciplinary actions taken against the student."

**Withdrawal**

Students may withdraw from the course with no record by 4 pm Friday, August 29th at the Registrar’s office. 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., ISBN-13: 978-0534408961, 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**:

Grade contributions are as follows: Non-Final Exams will count 25% each toward one’s grade. The assigned problems 10%. The Final Exam 15%.

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.

**Exam Schedule**

Exam I: September 12

Exam II: October 10

Exam III: November 14

Final Exam: December 14 (10:15 AM-12:15 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