

## PHYS1224 Principles of Physics I

**Department: Mathematics, Physics and Engineering**

**Credit Hours: 4**

**Required or Elective (circle one)**

### **Current Catalog Description:**

This is an introduction to mechanics, heat, and wave motion. A calculus-based course for Physical Science, Engineering, and Mathematics majors.

### **Course Schedule:**

3 lecture hr/wk, 3 lab hr/week

### **Textbook(s):**

Fundamentals of Physics, 8<sup>th</sup> Ed., Halliday, Resnick, and Walker, 2007

Webassign Access Code

Schaum's Outlines Physics for Engineering and Science, Michael Brown, 1998

### **Coordinator:**

Dr. Daniel K. Marble

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### **Course Web Page:**

Homework: <http://www.webassign.com>

<http://www.math.tarleton.edu/faculty/marble/physics1224/default.html>

### **Prerequisites by Topic:**

MATH1204 – Calculus I (co-requisite)

### **Course Grading:**

### **Program Outcome and Course Learning Goals Map:**

The Program Outcomes for Engineering Physics are:

- A. an ability to apply knowledge of math, engineering & science
- B. an ability to design and conduct experiments, as well as to analyze and interpret data
- C. an ability to design system, component or process to meet needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- D. an ability to function on multi-disciplinary teams
- E. an ability to identify, formulate, and solve engineering problems
- F. an understanding of professional and ethical responsibility
- G. an ability to communicate effectively
- H. the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
- I. a recognition of need for, and ability to engage in life-long learning
- J. a knowledge of contemporary issues
- K. an ability to use techniques, skills, and modern engineering tools necessary for engineering practice.
- L. a depth and breadth of knowledge in engineering and physics necessary to work in a multidisciplinary environment

<b>Course Goals</b> Upon completion of this course with a C or better, students will	<b>Program Outcome(s):</b>
1. be able to state the definitions of position, displacement, velocity, and acceleration using both words and equations. and be able to use them to describe the motion of simple physical systems.	A
2. be able to apply the definitions of position, displacement, velocity, and acceleration to analyze 1-dimensional and 2-dimensional motion problems for simple physical systems using position-time, velocity-time, or acceleration-time graphs.	A
3. be able to apply the definitions of position, displacement, velocity, and acceleration to analyze 1-dimensional and 2-dimensional motion problems for simple physical systems using Calculus.	A
4. be able to apply the principle of conservation of linear momentum to analyze problems involving isolated systems and collisions.	A
5. be able to apply work and energy concepts including the Work-Energy Theorem, and Conservation of Mechanical Energy to analyze problems involving mechanical systems including systems with only conservative forces and those involving sliding friction.	A
6. Be able to associate each type of energy change (mechanical, kinetic, and potential) and the corresponding force(s) whose work on the system causes these energy changes.	A
7. be able to apply the kinematic equations to analyze systems with constant acceleration.	A
8. use computer based data acquisition and video analysis systems to design and conduct simple experiments.	A, B, D
9. be able to analyze experimental data and develop suitable mathematical models that describe the results.	A, B, D
10. be able to apply conservation of angular momentum to analyze systems involving collision or in which no net external torque is applied.	A
11. be able to analyze potential energy-position graphs to determine positions of system equilibrium.	A
12. be able to analyze systems involving simple harmonic oscillation with and without damping.	A
13. be able to draw free body diagrams and apply Newton's Laws to analyze the motion and forces applied to simple mechanical systems.	A
14. be able to determine if a force is conservative and the associated potential energy function corresponding to a particular conservative force.	A
15. be able to state the definitions for angular position, angular velocity, angular acceleration and moment of inertia in both words and equations.	A
16. be able to apply the definitions for angular position, angular velocity, angular acceleration, and moment of inertia to solve rotational motion problems involving rigid bodies using either graphical or analytical techniques.	A

**Academic Honesty:**

Cheating, plagiarism (submitting another person's materials or ideas as one's own), or doing work for another person who will receive academic credit are all-impermissible. This includes the use of unauthorized books, notebooks, or other sources in order to secure or give help during an examination, the unauthorized copying of examinations, assignments, reports, or term papers, or the presentation of unacknowledged material as if it were the student's own work. Disciplinary action may be taken beyond the academic discipline administered by the faculty member who teaches the course in which the cheating took place.

**Students With Disabilities Policy:**

It is the policy of Tarleton State University to comply with the Americans with Disabilities Act (ADA) and other federal, state, and local laws relative to the provision of disability services. Students with disabilities attending Tarleton State University may contact the Office of Disability Services at (254) 968-9478 to request appropriate accommodation. Furthermore, formal accommodation requests cannot be made until the student has been officially admitted to Tarleton State University.

**Contribution of Course to Meeting the Professional Requirement:**

Math/Science Topics: 100%

**Status of Continuous Improvement Review of this Course:**

**Prepared by:** Daniel K. Marble

**Date:** March 18, 2008

**Reviewed by:** Jimmy McCoy

**Date:** March 23, 2008