Course Number: PHYS-1401

Course Title: General Physics I

Course Description:

*Lecture:* Fundamental principles of physics, using algebra and trigonometry; the principles and applications of classical mechanics and thermodynamics, including harmonic motion, mechanical waves and sound, physical systems, Newton’s Laws of Motion, and gravitation and other fundamental forces; with emphasis on problem solving.

*Lab:* Laboratory activities will reinforce fundamental principles of physics, using algebra and trigonometry; the principles and applications of classical mechanics and thermodynamics, including harmonic motion, mechanical waves and sound, physical systems, Newton’s Laws of Motion, and gravitation and other fundamental forces; emphasis will be on problem solving.

Course Credit Hours: 4

Lecture Hours: 3
Lab Hours: 3

Prerequisites: MATH 1314, and either MATH 1316 or MATH 2312

Student Learning Outcomes: Upon successful completion of this course, students should be able to do the following:

**Lecture**

1. Determine the components of linear motion (displacement, velocity, and acceleration), and especially motion under conditions of constant acceleration.
2. Apply Newton’s laws to physical problems including gravity.
3. Solve problems using principles of energy.
4. Use principles of impulse and linear momentum to solve problems.
5. Solve problems in rotational kinematics and dynamics, including the determination of the location of the center of mass and center of rotation for rigid bodies in motion.
6. Solve problems involving rotational and linear motion.
7. Describe the components of a wave and relate those components to mechanical vibrations, sound, and decibel level.
8. Demonstrate an understanding of equilibrium, including the different types of equilibrium.
9. Discuss simple harmonic motion and its application to quantitative problems or qualitative questions.
10. Solve problems using the principles of heat and thermodynamics.
11. Solve basic fluid mechanics problems.

**Lab**

1. Demonstrate techniques to set up and perform experiments, collect data from those experiments, and formulate conclusions from an experiment.
2. Record experimental work completely and accurately in laboratory notebooks, and communicate experimental results clearly in written reports.
3. Determine the components of linear motion (displacement, velocity, and acceleration), and especially motion under conditions of constant acceleration.
4. Apply Newton’s laws to physical problems including gravity.
5. Solve problems using principles of energy.
6. Describe the components of a wave and relate those components to mechanical vibrations, sound, and decibel level.
7. Use principles of impulse and linear momentum to solve problems.
8. Solve problems in rotational kinematics and dynamics, including the determination of the location of the center of mass and center of rotation for rigid bodies in motion.
9. Solve problems involving rotational and linear motion.
10. Demonstrate an understanding of equilibrium, including the different types of equilibrium.
11. Discuss simple harmonic motion and its application to quantitative problems or qualitative questions.
12. Solve problems using the principles of heat and thermodynamics.
13. Solve basic fluid mechanics problems.

- Additional Collin Outcomes:
  1. Demonstrate knowledge of basic units of measurement and their relationships
  2. Solve problems through equations involving the motion of bodies (Critical Thinking; Empirical/Quantitative)
  3. Solve problems involving forces including frictional forces
  4. Solve problems involving work and energy
  5. Solve problems involving momentum and collisions
  6. Explain the basic principles of fluid dynamics
  7. Apply the principles of heat and thermodynamics
  8. Explain and apply the principles of wave motion and sound
  9. Demonstrate the collections, analysis, and reporting of data using the scientific method (Communication Skills; Teamwork)

Withdrawal Policy: “See the current Collin Registration Guide for the last day to withdraw. “

Collin College Academic Policies: “See the current Collin Student Handbook.”

Academic Dishonesty: “See section 7-2.2 of the Collin Student Handbook.”

Americans with Disabilities Act: Collin College will adhere to all applicable federal, state and local laws, regulations and guidelines with respect to providing reasonable accommodations as required to afford equal opportunity. It is the student’s responsibility to contact the ACCESS office, SCC-G200 or 972.881.5898 (V/TTD: 972.881.5950) to arrange for appropriate accommodations. See the current Collin Student Handbook for additional information.
INSTRUCTOR INFORMATION

Instructor’s Name: Meade Brooks  
Office Number: 213 Lawler Hall, Preston Ridge Campus, Science Building  
Office Hours: Available at http://iws.collin.edu/mbrooks/officehours.html  
Phone Number: 972-377-1640 (do not leave voicemail, email instead)  
Email: mbrooks@collin.edu

Class Information:
Section Number: P01
Meeting Times/Location: Tue/Thu from 11:30 AM - 12:45 PM in room LH225 at the Preston Ridge Campus.

Minimum Technology Requirement: The following chart lists minimum standard requirements to access and run the online applications used for this course. For more information visit http://online.collin.edu/eLC_gettingstartedonline.html.

<table>
<thead>
<tr>
<th>OS (Operating System)</th>
<th>Windows: 98, XP, Vista</th>
<th>Apple: Mac OS 10.2, 10.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor</td>
<td>Pentium or later</td>
<td>Any Intel-based Macintosh; any PowerPC G3 333 MHz or later</td>
</tr>
<tr>
<td>Memory</td>
<td></td>
<td>512 MB RAM</td>
</tr>
<tr>
<td>Audio</td>
<td>SoundBlaster or compatible 16-bit sound card with speakers or headphones</td>
<td>Built-in audio (included with your Macintosh) with either speakers or headphones</td>
</tr>
<tr>
<td>Access to the Internet</td>
<td>Broadband via DSL, cable, or satellite is preferred</td>
<td></td>
</tr>
<tr>
<td>Java Runtime Environment</td>
<td>Required. Java for Windows</td>
<td>Required. Java for Apple</td>
</tr>
<tr>
<td>Browser</td>
<td>Click here to view Blackboard Supported Browsers. Be sure to disable any browser pop-up blockers (tutorial).</td>
<td></td>
</tr>
</tbody>
</table>

Minimum Student Skills: Students should have the attributes, skills and knowledge necessary for success in this course including: self-motivation, good time-management skills, self-discipline, good reading comprehension, persistence, available time, ability to use a laptop, printer, software, and the Internet.

Netiquette Expectations: N/A
Textbooks:
Lecture Textbook
This course uses a FREE innovative textbook developed by OpenStax college combined with the MasteringPhysics online homework system. The textbook is available at the following link in a variety of convenient digital formats for which a paper copy can also be printed.
http://openstaxcollege.org/textbooks/college-physics/get

Lab Textbook
The physics labs for this course have been written by the Collin College Physics faculty and are available as free downloads from within the course Blackboard system (accessible through CougarWeb).

Assignments:
Your assignments for this class consist of the following components:

1. Homework problems which you will complete online via MasteringPhysics
2. Physics Video Worksheets which you will complete as you watch the Mechanical Universe physics video series
3. A "Physics of Sports" project

BY FAR your assignments have the greatest impact on your final grade. So how well you do largely depends on how hard you work, not your test scores.

1. HOMEWORK PROBLEMS

The homework problems for this class will be accessed online via the MasteringPhysics assignment system. We have a special 1-semester access purchase option of $30 available to Collin students here:
http://www.pearsoncustom.com/tx/CollinCollegePhysics_1401_1402/

Other purchasing options are available on the MasteringPhysics site. Once you have purchased your MasteringPhysics hw account you will be able to access your assignments at www.masteringphysics.com. Upon start of class a MasteringPhysics course ID will be posted in Blackboard which is required to access assignments for this course.

The best way to study for tests in this course is to thoroughly complete and understand the homework. Test problems will reflect an understanding of both homework problems and examples worked in the lecture.

2. PHYSICS VIDEO WORKSHEETS

This is an easy way to get a grade of 100 that will count 10% of your final average! Complete the video worksheets as you watch what many consider to be the best physics video series ever produced (The Mechanical Universe). Due dates are coordinated to follow the textbook material you will be covering. All videos are available online (high-speed connection recommended) at this location:

3. PHYSICS OF SPORTS PROJECT

Physics is best learned and appreciated through real-world applications. All sports involve physics and this project will give you a chance to explore the physics of your favorite sport.
You will give a brief presentation of your project near the end of the semester. Project information is available at:

**Supplies:** You should have a scientific calculator, computer with internet access, and Scantron forms for exams (the small half-sheet size)

**Attendance Policy:** Attendance will be checked every class meeting and bonus points given based on attendance.

**Method of Evaluation:** Course averages will be calculated as follows:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework Problems</td>
<td>30%</td>
</tr>
<tr>
<td>Physics Video Assignments</td>
<td>10%</td>
</tr>
<tr>
<td>Sports Physics Project</td>
<td>5%</td>
</tr>
<tr>
<td>Labs Reports</td>
<td>25%</td>
</tr>
<tr>
<td>Midterm Exam</td>
<td>15%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>15%</td>
</tr>
</tbody>
</table>

100 % possible

Grades will be determined as follows:
90 – 100 = A
80 – 89 = B
70 – 79 = C
60 – 69 = D
0 – 59 = F

**Course Calendar:** Assignments that correspond to each chapter should be completed as outlined in the Course Schedule on the next page. Course requirements include homework problems, labs, video assignments, a physics of sports project, and two exams.

**Homework Problems:** The homework problems will be delivered and graded through the MasteringPhysics system.

**Labs:** Students will participate in at least 12 experiments during this course, each designed to investigate concepts covered in the lectures. Individual lab instructors will provide more information on lab grading policies and guidelines. Lab schedules are available at http://iws.collin.edu/mbrooks/physics/physics%20labs.htm and from within the course Blackboard system.

**Video Assignments:** Involves watching the Mechanical Universe physics video series (accessible online) and completing a video worksheet for each video.

**Physics of Sports Project:** Physics is best learned and appreciated through real-world applications. This project will give you a chance to explore the physics of your favorite sport.

**Exams:** A midterm and final exam will be given during this course. The final exam will be comprehensive. All tests will be given in class. Reviews for each exam are available at Professor Brooks’ website.
<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topic</th>
</tr>
</thead>
</table>
| 1    | T Jan-20, R Jan-22 | Chapter 1: The Nature of Science and Physics  
Chapter 2: One-Dimensional Kinematics |
| 2    | T Jan-27, R Jan-29 | Complete Chapter 2  
Chapter 3: Two-Dimensional Kinematics |
| 3    | T Feb-3, R Feb-5 | Complete Chapter 3  
Chapter 4: Dynamics: Newton's Laws of Motion |
| 4    | T Feb-10, R Feb-12 | Complete Chapter 4  
Chapter 5: Further Applications of Newton's Laws: Friction, Drag, and Elasticity |
| 5    | T Feb-17, R Feb-19 | Chapter 6: Uniform Circular Motion and Gravitation  
Chapter 7: Work, Energy, and Energy Resources |
| 6    | T Feb-24, R Feb-26 | Complete Chapter 7  
Chapter 8: Linear Momentum and Collisions |
| 7    | T Mar-3, R Mar-5 | Complete Chapter 8  
Review for Midterm Exam |
| 8    | T Mar-17, R Mar-19 | Midterm Exam (Chapters 1-8)  
Review Midterm Exam, begin Chapter 9: Statics and Torque |
| 9    | T Mar-24, R Mar-26 | Complete Chapter 9  
Chapter 10: Rotational Motion and Angular Momentum |
| 10   | T Mar-31, R Apr-2 | Complete Chapter 10  
Chapter 11: Fluid Statics |
| 11   | T Apr-7, R Apr-9 | Chapter 12: Fluid Dynamics and Its Biological and Medical Applications  
Chapter 13: Temperature, Kinetic Theory, and the Gas Laws |
| 12   | T Apr-14, R Apr-16 | Chapter 14: Heat and Heat Transfer Methods  
Complete Chapter 14 |
| 13   | T Apr-21, R Apr-23 | Chapter 15: Thermodynamics  
Chapter 16: Oscillatory Motion and Waves |
| 14   | T Apr-28, R Apr-30 | Complete Chapter 16  
Chapter 17: Physics of Hearing |
| 15   | T May-5, R May-7 | Class Presentations: The Physics of Sports  
Review for Final Exam (Chapters 1 - 17) |
| 16   | R May-14 | FINAL EXAM - Comprehensive (Chapters 1 - 17)  
Note: Final Exam given IN CLASS. |