## Syllabus

<table>
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<tr>
<th>Course</th>
<th>PHYS 114 Introduction to Physics I (4) 11 – 11:50 am M W Th F Darwin 35</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instructor</td>
<td>Dr. So Young Han, <a href="mailto:hanso@sonoma.edu">hanso@sonoma.edu</a>, <a href="http://www.sonoma.edu/users/h/hanso/">www.sonoma.edu/users/h/hanso/</a></td>
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<tr>
<td>Office Hours</td>
<td>MWR: 10 – 10:45 am, Darwin 300B, Tel.:664-3242</td>
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### Course Description:
Lecture, 4 hours. The first of three basic sequential courses in physics for science and mathematics majors. Introduction to vectors and classical mechanics. Satisfies GE, category B1 or B3 (Physical Sciences).

### Prerequisite:
MATH 161

### Text:
I do not require you to purchase a book.
I am using *Physics for Scientist and Engineers* (recommended) 7th or 8th Edition by Raymond A. Serway and John W. Jewett

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## Course Objectives

This course is a calculus-based introduction to the principles of classical mechanics. Selected topics includes SI unit, Vectors, Kinematics in one and two dimensions, Force, Newton’s Laws of Motion, Energy and Energy Conservation, Momentum and Momentum conservation and Rotational Motion. The expected outcomes from the PHYS114 are:

1. Students should understand and be able to demonstrate their understanding of the principles and concepts introduced.
2. Students will practice logical thinking process, which is essential in science.
3. Students will develop cognitive understanding of science concepts through in-class demonstrations and exercises.
4. Students will discuss in groups to develop their cooperative skills and reinforce their understanding of concepts.
5. Students should develop problem solving skills and be able to apply method and appropriate technology such as mathematics and computer applications to the study of science.

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## Attitudes

Be respectable, be responsible and be productive.

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## B1 GE Learning Objectives

This course is classified as a B1 GE class. In natural sciences, humans use their perceptions and quantitative reasoning to discover the principles and rules that govern how the universe works. Courses in this area of general education examine important theories of the natural sciences, and methods and models by which scientific investigation proceeds. They also seek to increase scientific understanding and to imbue students with the sense of curiosity and wonder about the natural world that inspires scientists and mathematicians in their work.

1. Develop knowledge of scientific theories, concepts, and data about living and non-living systems.
2. Understand how the scientific method is used to develop scientific principles and interpret evidence.
3. Appreciate the value systems and ethics associated with scientific inquiry, and the potential limits of scientific endeavors.
4. Demonstrate understanding of the scientific method through laboratory exercises.
5. Read and understand mathematical arguments and data, and use mathematics effectively to analyze and solve problems that arise in ordinary and professional life.

### Area B1 Specific Learning Objectives

1. Gain an understanding of the fundamental laws and principles governing the behavior of the physical world.
2. Understand the physical world through interpretation of results from experimentation and/or observation.
3. Learn that there are interactions between matter and energy and use this knowledge to understand physical, chemical, or geological phenomena.
4. Develop a basic understanding of physical matter and the scientific method so that they can apply this understanding to more complex systems.
University Policies

There are important University policies that you should be aware of, such as the add/drop policy; cheating and plagiarism policy, grade appeal procedures; accommodations for students with disabilities and the diversity vision statement
http://www.sonoma.edu/uaffairs/policies/studentinfo.shtml
http://www.sonoma.edu/UAffairs/policies/cheating_plagiarism.htm

Academic Integrity

Students are expected to be honest in meeting the requirements of courses in which they are enrolled. Do not look up solutions to homework problems online or copy solutions from your peers. Cheating or plagiarism is dishonest, undermines the necessary trust upon which relations between students and faculty are based, and is unacceptable conduct. Students who engage in cheating or plagiarism will be subject to academic sanctions.

Accommodations for Students with Disabilities

If you need disability related accommodations for this class, such as a note taker, test taking services, special furniture, use of service animal, etc., please contact the office of Disabled Student Services (DSS) located in Salazar Hall, Room 1049, Tel: 664-2677

Outline

Attendance: Class attendance as well as developing your problem solving skills is crucial in the course. In case of an absence, the student is responsible for the learning experience and missing assignments made during his/her absence. Being absent does not excuse you from anything that was discussed or due in class or lecture.

Grade:

Best 2 of 3 Exams + Final 50%
Homework 20%
Quiz 30%

A [93 above, A- [92-89], B+ [88-86], B [85-83], B- [82-79], C+ [78-76], C [75-73], C- [72-69], D [68-60], F [Below 60]

*(www.sonoma.edu/users/h/hanso/)

Most communication and the important dates will be posted on this web page. Check the instructor’s website frequently.

* Grades are based on an absolute scale, not a curve.

* Exam

No Make-up Exam/Quiz will be given.
You can drop one exam and one quiz score.
If you have above 90% average in exams before the final, you may be excused from the final and the final exam grade will be recorded as 93%.

* Homework and Quizzes

Each homework assignment will be posted at www.sonoma.edu/users/h/hanso/.
You may submit a late homework no later than 1 week after the due.
There is a 10% deduction in the late homework scores.
Write homework questions and show your works. Draw a box around the final answer.
You will have a quiz on the homework due date.
The regular quiz schedule will be posted at www.sonoma.edu/users/h/hanso/
5 minute pop quizzes will be given without announcement. (Bonus points.)

* In the class

Using a personal laptop or a phone is not allowed in class.
If you need to leave early you need to write a note.

* Tutors are available at the tutoring center and through SPS (our local physics club)

I also suggest for you to work with peers. However do not depend on others. Being able to complete homework with others does not mean that you have developed your problem solving skills.
### Tentative Schedule

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<th>Week</th>
<th>Dates</th>
<th>Topics</th>
<th>Notes</th>
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<tr>
<td>W1</td>
<td>(Aug 26 – 28)</td>
<td>Introduction, Topic 1</td>
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<tr>
<td>W2</td>
<td>(Aug 31 – Sep 4)</td>
<td>Topic 2</td>
<td>Sep 7 Labor Day Holiday</td>
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<td>W3</td>
<td>(Sep 7 – Sep 11)</td>
<td>Topic 3</td>
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<tr>
<td>W4</td>
<td>(Sep 14 – 18)</td>
<td>Topic 4</td>
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<td>W5</td>
<td>(Sep 21 – 25)</td>
<td>Topic 5</td>
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<tr>
<td>W6</td>
<td>(Sep 28 – Oct 2)</td>
<td>Exam 1 on Sep 25</td>
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<td>W7</td>
<td>(Oct 5 – 9)</td>
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<td>W8</td>
<td>(Oct 12 – 16)</td>
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<td>W9</td>
<td>(Oct 19 – 23)</td>
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<td>W10</td>
<td>(Oct 26 – 30)</td>
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<td>W11</td>
<td>(Nov 2 – 6)</td>
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<tr>
<td>W12</td>
<td>(Nov 9 – 13)</td>
<td>Topic 6</td>
<td>Nov 11 Veteran’s Day</td>
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<tr>
<td>W13</td>
<td>(Nov 16 – 20)</td>
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<td>Nov 25 - 27 Thanksgiving</td>
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<td>W14</td>
<td>(Nov 23)</td>
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<tr>
<td>W15</td>
<td>(Nov 30 – Dec 4)</td>
<td>*Topic 7</td>
<td>Exam 3 on Nov 23</td>
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<tr>
<td>W16</td>
<td>(Dec 7 – 11)</td>
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**Final Exam:** (Dec 14 Monday 11am – 12:50 pm)

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**Topic 1. Introduction and Math Review**

- **Math Assessment Test**
  - Math Review:
    - Trigonometry, Quadratic Equation
    - Geometry (Triangles, Circles, Area, Volume...) Derivatives of simple functions, Integrals, SI unit and Unit conversions, Power of 10 and Prefixes

- **Topic 2. 1D Motion**
  - Position and Coordinate System
  - Vector vs. Scalar
  - Distance and Displacement
  - Speed, Velocity and Acceleration
  - Constant Motion
  - 1D Kinematic Equations and Uniformly accelerated motion
  - Freefall problem

- **Topic 3. Vectors and 2D Motion**
  - Vector Analysis
  - Motion in Two Dimensions
  - 2D Kinematic Equations
  - Projectile Motion

- **Topic 4. Forces**
  - Force and Acceleration
  - Various Forces
  - Mechanical Equilibrium
  - Newton’s Laws of Motion
  - Applications
  - Circular Motion

- **Topic 5. Energy**
  - Energy
  - Work, K.E. and P.E.
  - Energy Conservation

- **Topic 6. Momentum**
  - Momentum and Force, Impulse
  - Momentum Conservation
  - Collisions

- **Topic 7. Rotational Motion**
  - Rotations
  - Angular Momentum
  - Angular Momentum Conservation
  - Torque
  - Static Equilibrium