

**Course Code & No. - Section:** PHYS 101 - Section 1 *NOTE: This is a MS Word TABLE*  
**Course Title (Credits):** Physics I (3), Physics I Lab 105 (1)  
**Term & Year:** Fall / 2014  
**Course Ref. No. (CRN):** 80003/80004

**Instructor:** Dr. Valery Altunin  
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**Office:** TCES 205 (physics/env. sci. laboratory)  
**Office Hours:** by appointment

**Class Meeting Time:** Monday 8:30-11:15 am and Wednesday, 8:30 -11:15am  
**Location:** TCES 205 (physics/env. sci. laboratory)

**Prerequisites (from Catalog):** MATH 110 or higher  
**Co-requisites (from Catalog):** PHYS 105 (lab)

### Course Description

This course focuses on physics concepts with utilization of algebra as a main mathematical tool. Topics from classical physics include: kinematics, Newton's laws of motion, conservation of laws of momentum and energy, gravitation, rotational mechanics and oscillations, states of matter, gases, fluids, and elements of thermodynamics. An emphasis is placed on utilization of physics laws in the environmental and biological sciences; the physics course syllabus is aligned with syllabi of Biology I and Environmental Systems to enhance the applicability of physics concepts to the life sciences.

### Student Outcomes

Upon successful completion of this course, a student will be able to:

1. Understand and recall the facts and concepts of classical mechanics and thermodynamics in conjunction with the environmental science and biological studies;
2. Demonstrate skill at reading and comprehending science texts;
3. Demonstrate ability to answer questions about physics like those on standardized exams (such as the GRE, MCAT, or senior exit exams);
4. Communicate about and critique scientific concepts in paragraph form;
5. Demonstrate skill at critical analysis, logic, and problem solving involving facts and concepts of classical physics;
6. Demonstrate competence in basic experimental techniques in physics.

### Methods of Assessing Student Outcomes

Student outcomes will be assessed using the following:

1. On-line homework assignments (Mastering Physics) of increasing levels of challenge;
2. Active participation in class;
3. Completion of the lab work;
4. Online in-class tests;
5. On-line in-class (Mastering Physics) midterm and comprehensive final examination that includes coverage of the topics discussed in the course outline.
6. Research essay on the topics related to the material covered in the course.

### Instructional Strategies

This class will utilize lectures, small groups, and individual work in class using laptop computers, inquiry learning, case studies, and homework assignments. The course makes use of the *Moodle* course management system.

## Required Texts and Materials

1. *Giancoli, Physics, Principles with Applications with Mastering Physics*; 6<sup>th</sup> ed, Pearson/Prentice Hall, 2009: ISBN-10: 0321569830. Students are required to have the text and access to the on-line materials at [www.masteringphysics.com](http://www.masteringphysics.com).
2. Physics with Vernier, By Kenneth Appel, John Gastineau, Clarence Bakken, and David Vernier, ISBN: 978-1-929075-42-3. (Physics Labs)
3. Internet access is required for obtaining course materials and completing some assignments. Students can complete the assignments using Internet access available in SNC's Prim Library. Digital work submitted must be compatible with Microsoft Office 2007 software.
4. The course syllabus, handouts, laboratory exercises, and other material will be posted on a Moodle site at <http://sncmoodle.sierranevada.edu>.
5. Laptop computer (one that meets the published SNC Laptop Requirements)

## Recommended Texts and Materials

1. *NROC Introductory Physics I, (Unit 1)* at <http://www.montereyinstitute.org/courses/Introductory%20Physics%20I/nroc%20prototype%20files/coursestartc.html>
2. Current articles related to class topics from highly readable sources such as **Science News** or **Scientific American** may be assigned as supplemental reading. These will be distributed in class and posted on the course Moodle site.
3. The publisher supports a physics web site ([www.masteringphysics.com](http://www.masteringphysics.com)) to accompany the text. This well-designed resource includes animations, tutorials, quizzes, and links to related web sites. A fast internet connection is recommended. Students will learn how to access the companion web site during the first class period.

## Prim Library Resources

Using the library's resources effectively (not just Internet resources) contributes to developing each of SNC's core themes by exposing students to high quality academic resources, diverse opinions, new ideas, and a future that includes building on a liberal arts education. In this course, you will be expected to utilize the library's resources (either on-site or remotely) as you complete your assignments.

Prim Library Resources for PHYS I and Lab include, but are not limited to:

1. Reference materials (for use inside Prim Library):
  - a. <http://www.annualreviews.org/journal/biophys>
  - b. <http://www.annualreviews.org/journal/energy>
2. Books (can be checked out):
  - a. Giancoli, Douglas C. *Physics : principles with applications* 5th ed.
  - b. Boyle, Joseph J. *Study guide : Physics : principles with applications*, fifth edition,
3. Electronic databases (for peer-reviewed research articles, reviews, newspaper and magazine articles):
  - a. <http://search.ebscohost.com/>
4. Hardcopy periodicals: Prim Library has current subscriptions for Science, New Scientist, Science News, and National Geographic Magazine. Any of these are likely to have articles on your term paper topic. Full-text articles from many more periodicals are available through the electronic databases.
5. Lib Guides: <http://Libguides.sierranevada.edu> These web pages contain instructions about how to use resources available at Prim Library, how to evaluate the appropriateness of information from the Internet for a research paper, how to cite sources, and other topics related to finding and using information.

## Attendance

It is highly recommended to attend all lectures and labs. If some lectures or labs will be missed for legitimate reasons (sick leave, the schedule conflict etc) an additional test or lab on the missed subject may be assigned. However, if the student will miss more than 30% of the course's time it will be considered as a failure (F).

## Course Organization and Structure

The course is based on the physics textbook *Giancoli, Physics, Principles with Applications*; 6<sup>th</sup> ed..

There will be two lectures (some times one) per one chapter of the textbook. At the end of second lecture on each chapter there will be a short quiz. The material for every chapter will be accompanied by a homework assignment. There will be two tests, Midterm and Final exam. Before each test and exams there will be a review/discussion of the homework assignments with the solutions for the most difficult problems.

### **Lectures**

Each lecture will contain Demonstration related to the lecture's content, explanation of the physics concept and the related real life examples preferably from the areas of environmental and biological studies.

### **Homework**

The homework grade will be determined from the online homework assignments at Mastering Physics ([www.masteringphysics.com](http://www.masteringphysics.com)).

### **Quizzes**

You can expect one quiz per week on the material covered in the current text book chapter (two lectures).

### **Laboratory**

Laboratory attendance is required. Before each lab we will discuss the purpose and outcomes of the work to be done. The discussion may include the relevant Physical applets simulations.

### **Research Project**

It is required that the students will conduct a short research on the subject of Physics related to their area of interest (Environmental or biophysical studies). A research proposal/topic submission is due by Oct 1. The final research essay and presentation to the class is due by the end of the semester (Dec1).

### **Class Requirements**

All students are required to bring a laptop computer to each class meeting. Cell phones and pagers must be turned off or set to 'silent mode'.

### **Sanctions for Cheating and/or Plagiarism**

Do not copy other people work blindly. Think about. Make conclusions. Use the quotation marks if needed.

### **The Honor Code**

The faculty of SNC believes students must be held to high standards of integrity in all aspects of college life in order to promote the educational mission of the College and to encourage respect for the rights of others. Each student brings to the SNC community unique skills, talents, values and experiences which, when expressed within the community, contribute to the quality of the educational environment and the growth and development of the individual. Students share with members of the faculty, administration and staff the responsibility for creating and maintaining an environment conducive to learning and personal development, where actions are guided by mutual respect, integrity, responsibility and trust. The faculty and students alike must make diligent efforts to ensure high standards are upheld by their colleagues and peers as well as themselves. Therefore faculty and students accept responsibility for maintaining these standards at Sierra Nevada College and are obligated to comply with its regulations and procedures, which they are expected to read and understand.

### **Consequences of Violating the Student Honor Code**

SNC students and faculty share the responsibility for maintaining an environment of academic honesty. Thus, all are responsible for knowing and abiding by the SNC Faculty/Student Honor Code published in the current SNC Catalog. Faculty is responsible for presenting the Honor Code and the consequences of violating it to students at the start of their classes AND for reporting all incidences of academic dishonesty to the Provost. Students are responsible for knowing what constitutes CHEATING, PLAGIARISM and FABRICATION and for refraining from

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these and other forms of academic dishonesty. Violations of the Honor Code become part of a student's academic record.

1<sup>st</sup> Offense: Student receives a zero for assignment/exam and counseling with faculty on the honor code, consequences for violating the honor code, and the value of academic honesty in learning.

2<sup>nd</sup> Offense: Student fails course and receives counseling with faculty on the honor code, consequences for violating the honor code, and the value of academic honesty in learning.

3<sup>rd</sup> Offense: Student is expelled.

### **Grading Policy**

Grading is based on the integral value of the points acquired by a student during the semester. Current amount of points will be available on MasteringPhysics grades page. The final grade will be determined by the amount of points averaged over different categories with the following weighting:

Final Exam:	30%
Midterm Exam:	20%
Tests:	20%
Homework:	10%
Quizzes	10%
Research:	10%

Lab work is graded separately.

### **ADA Accommodations**

In accordance with the Americans with Disabilities Act and Section 504 of the Rehabilitation Act of 1973, students with a documented disability are eligible for support services and accommodations. If a student wishes to request an accommodation, please contact the Director of Academic Support Services, Henry Conover, at (775) 831-1314 x7534, [hconover@sierranevada.edu](mailto:hconover@sierranevada.edu), office in Prim Library: PL-304.

### **The SNC Email System**

The SNC email system is the official communication vehicle among students, faculty members and administrative staff and is designed to protect the confidentiality of student information as required by the Family Educational Rights and Privacy Act of 1974 Act (FERPA). Students should check their college email accounts daily during the school year.

Students have a right to forward their SNC e-mail to another e-mail account (for example, @hotmail or @gmail). However, confidentiality of student information protected by FERPA cannot be guaranteed for SNC e-mail forwarded to an outside vendor. Having email redirected does not absolve a student from the responsibilities associated with official communication sent to his or her SNC email account.

### **The Sierra Nevada College Mission Statement:**

Sierra Nevada College graduates will be educated to be scholars of and contributors to a sustainable world. Sierra Nevada College combines the liberal arts and professional preparedness through an interdisciplinary curriculum that emphasizes entrepreneurial thinking and environmental, social, economic and educational sustainability.

### **The Core Themes:**

Liberal Arts	Professional Preparedness
Entrepreneurial Thinking	Sustainability

**Class Schedule**

Aug. 18	Course Overview, Lecture I-1: Introduction; The science of Physics Text: Ch. 1: 1.1 – 1.3, Introduction to Mastering Physics (web assignment)
Aug. 20	Lecture I-2: Measurements in Physics. Text: Ch. 1: 1.4 – 1.8 Lecture I-3: KINEMATICS - Describing motion Text: Ch. 2, 2.1 – 2.4
Aug. 25	Lecture I-4: Kinematics in one dimension Text: Ch. 2, 2.5 – 2.8 Lab: 01 Graph Matching (Set up)
Aug. 27	Lecture I-5: Kinematics in two or three dimensions; vectors Text: Ch.3, 3.1 – 3.4 Lab: 01 Graph Matching (due date)
Sep. 3	Lecture I-6: Kinematics in two or three dimensions Text: Ch.3, 3.5 – 3.8 Lab: 02 Determining $g$ on Incline (set up)
Sep. 8	Lecture I-7: DYNAMICS - Newton's Laws of motion Text: Ch. 4, 4.1 - 4.5 Lab: 02 Determining $g$ on Incline (due date)
Sep. 10	Lecture I-8: Application of Newton's Laws Text: Ch. 4, 4.6 – 4.9 Lab: 03 Newton's Third Law
Sep. 15	Lecture I-9: Circular Motion Text: Ch. 5, 5.1 - 5.5 Lab: 04 Newton's Second Law (set up)
Sep. 17	Lecture I-10: Newton's Law of Gravity; Types of forces in nature. Text: Ch. 5, 5.6 – 5.10 Lab: 04 Newton's Second Law (due date)
Sep. 22	Review of Homework assignments Text: Ch. 2 – Ch.5 Test -1; KINEMATICS and DYNAMICS
Sep. 24	Lecture I-11; Work and Energy Text: Ch. 6, 6.1 – 6.4 Lab: 05 Work and Energy (set up)
Sep. 29	Lecture I-12; Conservation of Energy; Power Text: Ch. 6, 6.5 – 6.10 Lab: 05 Work and Energy (due date)
Oct. 1	Lecture I-13; Linear Momentum; Collisions Text: Ch.7; 7.1 – 7.5

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	Lab: 06 Momentum, Energy (set up)
Oct. 6	Lecture I-14; Linear Momentum, Center of Mass Text: Ch.7; 7.6 – 7.10 Lab: 06 Momentum, Energy (due date)
Oct. 8	Review of Home assignments; Review of research Ideas
Oct. 13	Midterm Exam
Oct. 15	Lecture I-15; Rotational Motion Text: Ch.8; 8.1 – 8.4 Lab: 07 Centripetal Acceleration (set up)
Oct. 20	Lecture I-16; Rotational Dynamics Text: Ch. 8; 8.5 – 8.9 Lab: 07 Centripetal Acceleration (due date)
Oct. 22	Lecture I-17; Static Equilibrium Text: Ch. 9; 9.1 – 9.4 Lecture I-18; Elasticity and Fracture Text: Ch. 9, 9.5- 9.7
Oct. 27	Lecture I-19, Vibrations Text: Ch. 11, 11.1 – 11.6 Lab: 08 Energy in Simple Harmonic Motion (set up)
Oct. 29	Lecture I-20, Waves Text: Ch. 11, 11.7 – 11.16 Lab: 08 Energy in Simple Harmonic Motion (due date)
Nov. 3	Lecture I-21; Static Fluids Text: Ch. 10, 10.1 – 10.7 Lecture I-22; Fluids in Motion Text: Ch 10, 10.8 – 10.14
Nov. 5	Review of Home Assignments Text: Ch.8 , 9, 11 Test - 2; Rotational Motion, Static Equilibrium and Vibrations
Nov. 10	Lecture I – 23; Characteristics of sound, Sources of sound Text: Ch.12, 12.1 – 12.4 Lab:#9, Speed of Sound (set up)
Nov. 12	Lecture I – 24; Sound Waves Text: Ch.12, 12.5 – 12.9 Lab: #9 Speed of Sound (due date)
Nov. 17	Lecture I-25; Temperature, Ideal Gas Text: Ch 13; 13.1 – 13.6, Lab: #10 Newton's Law of cooling (set up)
Nov. 19	Lecture I-26; Kinetic Theory Text: Ch 13, 13.7 – 13-14 Lab: #10 Newton's Law of cooling (due date)

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- Nov. 24      Lecture I-27; Heat  
                 Text: Ch. 14; 14.1 – 14.5  
                 Lecture I-28; Heat Transfer  
                 Text: Ch. 14; 14.6 – 14.8
- Dec. 1        Lecture I-29; Laws of Thermodynamics; Heat Engines  
                 Text: Ch. 15, 15.1 – 15.6  
                 Lecture I-30, Laws of Thermodynamics; Entropy  
                 Text: Ch. 15, 15.7 – 15.12
- Dec. 3        Review of Homework assignments,  
                 Review of the Research Essays
- Dec. 9        Final Exam (8-11 am)
- Dec. 14      Semester Ends
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