

Course Code & No. - Section: PHYS 102 - Section 1 *NOTE: This is a MS Word TABLE*
Course Title (Credits): PHYS 102 (3), PHYS LAB 106 (1)
Term & Year: Spring / 2016
Course Ref. No. (CRN): 10052/10053

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

Class Meeting Time: Tuesday and Thursday, 08:30-11:15
Location: TCES 205 (physics/env. sci. laboratory)

Prerequisites (from Catalog): MATH 110 or higher
Co-requisites (from Catalog): PHYS 106 (lab)

Course Description

This course focuses on physics concepts with utilization of algebra as a main mathematical tool. Topics from classical physics include: electrostatics and magnetism, electric currents and circuits, electrodynamics and electromagnetic waves, optics, elements of theory of relativity and quantum theory, nuclear and elementary particles physics. 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 electromagnetism, optics and some advanced concepts of modern physics 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*; 6th 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.
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://moodle.sierranevada.edu/moodle/>.
5. Laptop computer (one that meets the published SNC Laptop Requirements)

Recommended Texts and Materials

1. *NROC Introductory Physics II, (Unit 3-5)* at <http://www.montereyinstitute.org/courses/Introductory%20Physics%20I/nroc%20prototype%20files/courses/startc.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) 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 II 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, Giancoli
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*; 6th 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).

Quizzes

You can expect one quiz per week and this will be on the material covered in the current text book lesson (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 March 1. The final research essay and presentation to the class is due by the end of the semester (May1).

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

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

1st 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.

2nd 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.

3rd 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/active participation	10%
Research:	10%

The grading for the lab works is determined based on the quality of work done and ability of the student analyze the results. Additional points will be given for doing the lab extensions.

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, 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

Jan.19	Course Overview, Working with mastering Physics, Electric Charge and Electric Force Text: Ch. 16, 16-1 – 16-6
Jan. 21	Electric Field Text: Ch. 16, 16-7 – 16-12 Lab: #1 Mapping Electric Field (Set up)
Jan. 26	Electric Potential and Electric Energy Text: Ch. 17, 17-1 – 17-6 Lab: #1 Mapping Electric Field
Jan. 28	Electric Potential and Capacitance Text: Ch. 17, 17-7 – 17-11 Lab: #1 Mapping Electric Field (Due date)
Feb. 2	Electric Currents and Resistance Text: Ch.18, Ch 18-1 – 18-4 Lab: #2, Charge it up (Set up)
Feb. 4	Electric Currents and Electric Power Text: Ch.18, Ch 18-5 – 18-10 Lab: #2, Charge it up (Due day)
Feb. 9	DC Circuits – Elements Text: Ch.19, Ch. 19-1 -19-4 Lab: #3, Ohm's law (Set up)
Feb. 11	DC Circuits Text: Ch.19, Ch. 19-5 – 19-8 Lab: #3, Ohm's law (Due Day)
Feb. 16	Review of Homework assignments Test 1; Electrostatic and Electric currents Text: Ch.17-19
Feb. 18	Magnetism Text: Ch. 20, 20-1 – 20-6 Lab: # 4 Magnetic Filed in a coil (set up)
Feb. 23	Magnetic Filed and Force Text: Ch. 20, 20-7-20-12 Lab: # 4. Magnetic Filed in a coil (Due day)
Feb. 25	Electromagnetic Induction and Faraday's Law Text: Ch. 21, 21-1 – 21-7 Electromagnetic Induction and Faraday's Law Text: Ch. 21, 21-8 – 21.14
Mar. 1	Electromagnetic Waves Text: Ch. 22, 22-1 – 22-4

	Electromagnetic Waves Text: Ch.22, 22-5 – 22-7
Mar. 3	Review of Homework assignments Text: Ch.20-22 Review of research Ideas
Mar.07-11	Midterm Exam
Mar.14-18	Spring Break
Mar. 22	Light: Geometric Optics Text: Ch.23, 23-1 – 23-4 Lab: #5, Lights Out
Mar. 24	Light: Geometric Optics Text: Ch. 23, 23-5 – 23-8 Lab: #6, Imaging with a lens (set up)
Mar. 29	The Wave Nature of Light Interference and Diffraction Text: Ch. 24; 24-1 – 24-6 Lab: #6 Imaging with a lens (due date)
Mar. 31	The Wave Nature of Light, Dispersion Text: Ch. 24, 24-7 – 24-12; Lab: # 7 Polarization of light (set up)
Apr. 5	Optical Instruments Text: Ch 25, Lab: #7 Polarization of light (due date)
Apr. 07	Review of Homework Assignments Text: Ch. 23-25 Test 2.
Apr. 12	The Special Theory of Relativity Text: Ch. 26, 26-1– 36-5 Lab: #8 Light and distance (set up)
Apr. 14	The Special Theory Relativity Text: Ch 26, 26-6 – 26-11 Lab: #8 Light and distance
Apr. 19	Quantum Theory and Models of the Atom Text: Ch. 27, Lab: #8 Light and Distance (Due date)
Apr. 21	Quantum Mechanics of Atoms Text: Ch. 28, Quantum Mechanics of Atoms Text: Ch. 28
Apr. 26	Molecules and Solids Text: Ch. 29 Molecules and Solids Text: Ch. 29

- May 03 Nuclear Physics and Radioactivity
 Text:Ch.30
 Nuclear Energy
 Text: Ch. 31
- May 05 Review of Homework Assignments, Questions
 Review of Research projects
- May 9-13 Final Exam (8:00-11:00 am)
- May. 18 Final grades filed with Register
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