ARIZONA STATE UNIVERSITY

GENERAL STUDIES COURSE PROPOSAL COVER FORM

Course information:

*Copy and paste **current** course information from Class Search/Course Catalog.*

Academic Unit: College of Liberal Arts and Sciences Department: Department of Physics

Subject: PHY Number: 150 Title: Physics 1 Units: 4

Is this a cross-listed course? No
If yes, please identify course(s)

Is this a shared course? No If so, list all academic units offering this course

Course description:
Introductory physics for majors. Kinematics, Newton's Laws, basic forces, energy, momentum, special relativity

Requested designation: Natural Sciences-SQ

*Note- a **separate** proposal is required for each designation requested*

Eligibility:

Permanent numbered courses must have completed the university's review and approval process.
For the rules governing approval of omnibus courses, contact Phyllis.Lucie@asu.edu or Lauren.Leo@asu.edu.

Submission deadlines dates are as follow:

For Fall 2015 Effective Date: October 9, 2014

For Spring 2016 Effective Date: March 19, 2015

Area(s) proposed course will serve:

A single course may be proposed for more than one core or awareness area. A course may satisfy a core area requirement and more than one awareness area requirements concurrently, but may not satisfy requirements in two core areas simultaneously, even if approved for those areas. With departmental consent, an approved General Studies course may be counted toward both the General Studies requirement and the major program of study.

Checklists for general studies designations:

Complete and attach the appropriate checklist

- Literacy and Critical Inquiry core courses (L)
- Mathematics core courses (MA)
- Computer/statistics/quantitative applications core courses (CS)
- Humanities, Arts and Design core courses (HU)
- Social-Behavioral Sciences core courses (SB)
- Natural Sciences core courses (SQ/SG)
- Cultural Diversity in the United States courses (C)
- Global Awareness courses (G)
- Historical Awareness courses (H)

A complete proposal should include:

- ☒ Signed General Studies Program Course Proposal Cover Form
- ☒ Criteria Checklist for the area
- ☒ Course Catalog description
- ☒ Course Syllabus
- ☒ Copy of Table of Contents from the textbook and list of required readings/books

Respectfully request that proposals are submitted electronically with all files compiled into one PDF. If necessary, a hard copy of the proposal will be accepted.

Contact information:

Name: Alicia Hawley Phone: 480-965-3561

Mail code: 1504 E-mail: alicia.hawley@asu.edu

Department Chair/Director approval: *(Required)*

Chair/Director name (Typed): Dr. Peter Bennett Date: 2/9/2015

Chair/Director (Signature): P. Bennett

Rev. 1/94, 4/95, 7/98, 4/00, 1/02, 10/08, 11/11/ 12/11, 7/12, 5/14

Arizona State University Criteria Checklist for

NATURAL SCIENCES [SQ/SG]

Rationale and Objectives

Public scientific literacy, critical for sound decisions on scientifically infused issues such as climate change, includes understanding of basic science concepts, such as the fundamental behavior of matter and energy. It also includes the understanding that "science" is not an encyclopedic collection of facts. Rather, it is a process of exploration that embraces curiosity, inquiry, testing, and communication, to reduce uncertainty about nature. Absent understanding of scientific concepts and of the nature of science, science and pseudoscience are difficult to distinguish, and normal scientific disagreements may be misinterpreted as ideological or political disputes. The goal of the natural sciences (SQ/SG) requirement, including the laboratory requirement, is to instill understanding of basic science content and of the nature of science in every ASU graduate.

10/1989
REV: 1/1991, 3/1991, 1/2000, 10/2008, 4/2014

Proposer: Please complete the following sections and attach appropriate documentation.

ASU--[SQ] CRITERIA

I. - FOR ALL *QUANTITATIVE* [SQ] NATURAL SCIENCES CORE AREA COURSES, THE FOLLOWING ARE CRITICAL CRITERIA AND MUST BE MET:

YES	NO		Identify Documentation Submitted
☒	☐	**A.** Course emphasizes the mastery of basic scientific principles and concepts.	Syllabus
☒	☐	**B.** Addresses knowledge of scientific method.	Syllabus
☒	☐	**C.** Includes coverage of the methods of scientific inquiry that characterize the particular discipline.	Syllabus
☒	☐	**D.** Addresses potential for uncertainty in scientific inquiry.	Syllabus
☒	☐	**E.** Illustrates the usefulness of mathematics in scientific description and reasoning.	Syllabus
☒	☐	**F.** Includes **weekly** laboratory and/or field sessions that provide hands-on exposure to scientific phenomena and methodology in the discipline, and enhance the learning of course material.	Syllabus
☒	☐	**G.** Students submit written reports of laboratory experiments for constructive evaluation by the instructor.	Syllabus
☒	☐	**H.** Course is general or introductory in nature, ordinarily at lower-division level; not a course with great depth or specificity.	Syllabus

II. - AT LEAST ONE OF THE FOLLOWING ADDITIONAL CRITERIA MUST BE MET WITHIN THE CONTEXT OF THE COURSE:

☒	☐	**A.** Stresses understanding of the nature of basic scientific issues.	Syllabus
☒	☐	**B.** Develops appreciation of the scope and reality of limitations in scientific capabilities.	Syllabus
☐	☐	**C.** Discusses costs (time, human, financial) and risks of scientific inquiry.	

NOTE: CRITERIA FOR [SG] COURSES BEGIN ON PAGE 4.

III. - [SQ] COURSES MUST ALSO MEET THESE ADDITIONAL CRITERIA:			
YES	**NO**		**Identify Documentation Submitted**
☒	☐	**A.** Provides a substantial, quantitative introduction to fundamental principles governing behavior of matter and energy, in physical or biological systems.	Syllabus
		B. Includes a college-level treatment of some of the following topics **(check all that apply below):**	Syllabus
☒	☐	**a.** Atomic and molecular structure	Syllabus
☐	☒	**b.** Electrical processes	
☐	☒	**c.** Chemical processes	
☐	☒	**d.** Elementary thermodynamics	
☐	☒	**e.** Electromagnetics	
☒	☐	**f.** Dynamics and mechanics	Syllabus
[SQ] REQUIREMENTS CANNOT BE MET BY COURSES:			
• **Presenting a qualitative survey of a discipline.**			
• **Focusing on the impact of science on social, economic, or environmental issues.**			
• **Focusing on a specific or limiting but in-depth theme suitable for upper-division majors.**			

Proposer: Please complete the following section and attach appropriate documentation.

ASU--[SG] CRITERIA			
I. - FOR ALL *GENERAL* [SG] NATURAL SCIENCES CORE AREA COURSES, THE FOLLOWING ARE CRITICAL CRITERIA AND MUST BE MET:			
YES	**NO**		**Identify Documentation Submitted**
☐	☐	**1.** Course emphasizes the mastery of basic scientific principles and concepts.	
☐	☐	**2.** Addresses knowledge of scientific method.	
☐	☐	**3.** Includes coverage of the methods of scientific inquiry that characterize the particular discipline.	
☐	☐	**4.** Addresses potential for uncertainty in scientific inquiry.	
☐	☐	**5.** Illustrates the usefulness of mathematics in scientific description and reasoning.	
☐	☐	**6.** Includes **weekly** laboratory and/or field sessions that provide hands-on exposure to scientific phenomena and methodology in the discipline, and enhance the learning of course material.	
☐	☐	**7.** Students submit written reports of laboratory experiments for constructive evaluation by the instructor.	
☐	☐	**8.** Course is general or introductory in nature, ordinarily at lower-division level; not a course with great depth or specificity.	
II. - AT LEAST ONE OF THE ADDITIONAL CRITERIA THAT MUST BE MET WITHIN THE CONTEXT OF THE COURSE:			
☐	☐	**A.** Stresses understanding of the nature of basic scientific issues.	
☐	☐	**B.** Develops appreciation of the scope and reality of limitations in scientific capabilities.	
☐	☐	**C.** Discusses costs (time, human, financial) and risks of scientific inquiry.	

[SG] REQUIREMENTS CANNOT BE MET BY COURSES:		
	• Presenting a qualitative survey of a discipline.	
	• Focusing on the impact of science on social, economic or environmental issues.	
	• Focusing on a specific or limiting but in-depth theme suitable for upper-division majors.	

Course Prefix	Number	Title	General Studies Designation
PHY	150	Physics I	SQ

Explain in detail which student activities correspond to the specific designation criteria. Please use the following organizer to explain how the criteria are being met.

Criteria (from checksheet)	How course meets spirit (contextualize specific examples in next column)	Please provide detailed evidence of how course meets criteria (i.e., where in syllabus)
I. A.	Students master basic scientific principles and concepts in homework, classwork, and laboratory.	Syllabus: Overview
I. B.	The Scientfic Method is used primarily in the laboratory portion of the course.	Syllabus: Overview and Laboratory
I. C.	Students use scientific inquiry when problem solving and in the laboratory.	Syllabus: Overview
I. D.	Students analyze the uncertainty in their laboratory data.	Syllbus: Overview

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course catalog & class search

Term: Spring 2015
Search: Course cata
Subject: PHY Num: 150
Level:
Gen Studies:
Keywords:
Offerings: In-person & IC

Search
Clear
Advanced Search

Click on the title of the course for more details. Each column can be sorted by clicking on the column header. Courses found: 1

Collapse

Course	Title	Units	GeneralStudies
PHY 150	**Physics I** Introductory physics for majors. Kinematics, Newton's Laws, basic forces, energy, momentum, special relativity. **Allow multiple enrollments:** No **Primary course component:** Lecture **Repeatable for credit:** No **Grading method:** Student Option **Offered by:** College of Liberal Arts and Sciences -- Department of Physics Pre-requisites: MAT 265 or MAT 270 with C or better; Pre/Co-requisites: MAT 266 or MAT 271 with C or better if completed	4	SQ

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course catalog & class search

Term: Spring 2015
Search: Course catalog
Subject: PHY Num: 150
Level:
Gen Studies:
Keywords:
Offerings: In-person & ICc

Search
Clear
Advanced Search

PHY 150 - Physics I — Spring

Course description: Introductory physics for majors. Kinematics, Newton's Laws, basic forces, energy, momentum, special relativity.

Enrollment requirements: Pre-requisites: MAT 265 or MAT 270 with C or better; Pre/Co-requisites: MAT 266 or MAT 271 with C or better if completed

Units: 4

Repeatable for credit: No

General Studies: SQ

Offered by: College of Liberal Arts and Sciences

Class meeting details

Class #:	Days:	Start:	End:	Location:	Instructor:	Seats open:
12462	M W F	8:30 AM	10:20 AM	Tempe - PSH356	Culbertson	5 of 45 Add

Additional class details

Component: Lecture
Session: Session C
Dates: 1/12/2015 - 5/1/2015
Instruction Mode: In-Person
Fees: $50 course fee

Books:
View books for this class

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PHY 150 Physics I: Mechanics

University Physics for Physics Majors
8:30 – 10:20 M-W-F Room PSH 356 Spring 2015. Course No. 12462

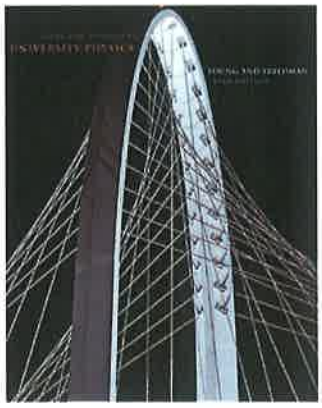
Instructor: Prof. Robert Culbertson
Office: PSH 553 Phone: (480) 965-0945 E-mail: robert.culbertson@asu.edu
Office Hours: 11:30am – 12:00pm Monday and Wednesday and by appointment

Graduate Teaching Assistant: Andrew Shevchuk
Email: Andrew.Shevchuk@asu.edu

Undergraduate Learning Assistants: Joy Nachman and Jacqueline Shortridge

ASU Catalog Description:

> **M PHY 150 Physics I. (4)**
> Introductory physics for majors. Kinematics, Newton's Laws, basic forces, energy, momentum, special relativity. 3 hours lecture, 3 hours lab. Prerequisites: MAT 265 or MAT 270 (or equivalent) with C or better; Pre/Co-requisites: MAT 266 or MAT 271 with C or better if completed. *General Studies: SQ.*



Text: Young, Hugh D. and Freedman, Roger A., *University Physics* (*with Mastering Physics*) *13th Edition.*
Note: do not purchase the version with *Modern Physics*.

Overview

This course emphasizes basic principles and concepts in the study of introductory Mechanics. Calculus I is a prerequisite and Calculus II is a co-requisite for this course, as many of the concepts in the course will be mathematically formulated and analyzed. Connections will also be made to everyday experiences, current events, relevant historical events, and the nature of basic scientific issues.

This course is taught in a studio type classroom, where student-student interaction is emphasized. This instructional format utilizes active learning and inquiry for introducing, refining, and mastering basics physical concepts and analysis techniques.

The weekly laboratory sessions involve quantitative investigation of phenomena in Mechanics. Students work in groups to set up experiments, make measurements, quantify the uncertainty of these measurements, analyze the results, and submit a written laboratory report. This report has a format that is similar to the format of scientific journal papers.

Course Format

- **Lecture/Recitation:** Little formal lecture will be given. Each student is responsible for doing the required reading prior to each class. Much of each class will be spent reviewing recent material and introducing new material; this will be accomplished partly through demonstrations and in-class problems that are performed by the class in small groups.
- **Homework:** Homework will use the *Pearson Publishing* online system *Mastering Physics* - our course number is **MPCULBERTSONPHY150SPRING2015**. These online assignments will be of two types: pre-lecture assignments and homework, and one of each will be assigned for each of the 12 chapters for the semester. Assignments are expected to be completed prior to class on the date indicated on the course schedule. If the score on any assignment is less than 95% an *Adaptive Follow-Up* assignment automatically will be added; the adaptive follow up assignment is relatively short and is typically due two calendar days after the parent assignment. Each assignment carries the same weight as every other homework set, regardless of the number of problems. Adaptive follow up assignments carry this same weight (a score of 95% or higher on any parent assignment will automatically give 100% on the associated adaptive follow up. (see Grading below). Late assignments will not be accepted. However, each student may request to make up one or two missed "parent" assignments; this will include the associated adaptive follow up assignment. (Missed adaptive follow up assignments cannot be made up.)
- **"Clicker Questions":** *Learning Catalytics*, also from Pearson Publishing, will be used for "clicker questions." However, instead of using clickers, a laptop, notebook, pad, or smart phone device is required. The frequency and number of these assignments will vary. Students who have not purchased the e-text option from Pearson Publishing must either upgrade to the e-text option or separately purchase a *Learning Catalytics* six-month subscription for $12. IMPORTANT: Purchase and register for *Learning Catalytics* through your *Mastering Physics* website; do not go to http://learningcatalytics.com.
- **In-Class Problems:** Additional problems often will be introduced in class and solved in small groups on whiteboards. A student will be selected at random to present an explanation of his/her work.
- **Quizzes:** A 20-minute quiz will be given nearly every week on Wednesday, except for exam days or class days immediately before or after an exam day. Quizzes will typically cover the previous three classes. Approximately eleven quizzes will be given during the semester. *No make-up quizzes will be offered.* However, the lowest *two* quiz grades will automatically be dropped. See also *Cellular Phones, etc.*, below.
- **Written Exams:** Two one-hour exams plus a final exam will cover the material in the text. Missing the final exam will result in a failing grade in the course. *No make-up exams will be given.*
- **Puzzlers:** Approximately once each week a problem will be offered that is somewhat of a puzzle. Up to two points will be awarded for a correct answer; one point will be awarded for an honest effort. These points will be added to the quiz grades. *Participation is optional.*

- **Jeopardy Challenges:** Similar to Puzzlers, Jeopardy "answers" will be given approximately once a week. Students who submit a correct question will receive one point added to their quiz scores. Students with particularly interesting, clever, and creative questions will receive two points. *Participation is optional.*
- **Laboratory:** (see also the description of laboratory procedures in the Laboratory document) Labs will take place during the Friday class time. Written reports are due at the beginning of the Monday class after the next lab begins. Students will work in assigned groups and a single group grade will be given for each report. Each student is responsible for the *entire* experiment and report – excuses such as "that was my lab partner's job" will not be accepted. Laboratory reports will be graded on a 10-point scale.
- **Participation**: A portion of your grade will be based on class participation and attendance.
- **Office Meetings**. You will receive 5 Participation Points (out of 100 possible points) for every bona fide meeting with your instructor up to a maximum of 20 points.
- **Grading:** The final course grade will be determined by homework, in-class problems, quiz grades, text exams, lab exam, lab reports, and a "participation" component, as indicated in the table below.

Homework	0.15
In-Class Problems and *Learning Catalytics*	0.15
Quizzes	0.10
Exams (2 at 7.5% each)	0.15
Final Exam	0.15
Laboratory	0.25
Participation	0.05
Total	**1.00**

- **Student Success Center:** The Student Success Center is available Monday-Friday, 9:00am – 6:00pm in PSF 186. It is dedicated to undergraduate students in need of help with their introductory physics (and earth/space science) courses. Throughout the semester the center is staffed with knowledgeable Faculty, Teaching Assistants, and/or Learning Assistants that are there to help students with homework or test preparation.
  Physics Majors may also request ISAAC access in the Physics Office (PSF 470) to gain entrance into the room after business hours.
  E-mail: Physics.SESE.SSC@asu.edu
  Phone: (480).727.3673
  Webpage: https://physics.asu.edu/content/physics-and-sese-student-success-center
  All Students must sign-in with their ASU ID card at the front desk
- **Academic Integrity:** Zero tolerance will be given to cheating of any kind. In every case a grade of **XE** will be given, and formal disciplinary procedures within the Arizona State University will be initiated. Students must be familiar with the ASU Academic Integrity Policy: http://provost.asu.edu/academicintegrity
- **Conduct:** Disruptive behavior will not be tolerated. Students are required to follow the ASU Student Code of Conduct: Arizona Board of Regents Policies 5-301 through 5-308: http://www.azregents.edu/policymanual/default.aspx

- **Computer Policy:** Students must be in compliance with the ASU Computer, Internet, and Electronic Communications Policy: http://www.asu.edu/aad/manuals/acd/acd125.html
- **Cellular Phones, etc.:** Cellular phones must always be in silent mode. No cellular phones, laptops, iPads, etc. may be used during class with the exception of exclusive use in *Learning Catalytics* sessions or laboratory sessions. A warning will be given for the first infraction or audible interruption. The second offense will result in the equivalent of a zero on one quiz. A student will be expelled from the course for the third offense.

Comments:

- Read the assigned text sections before each class. Pay close attention to example problems.
- Work problems in addition to the homework assignments. You can find many more problems that are easier than, equivalent to, or harder than the assigned problems.
- When solving problems, avoid inserting numerical values until the last possible moment. Then, check your units, and always check to see if the answer is reasonable.
- You are encouraged to work homework problems with other students from the class. Do not just copy someone else's work, however. Make sure you understand the solutions.
- Utilize the Student Success Center when working on homework. This facility is attended by a faculty member or teaching assistant during most of the day, and they are there to help you with your questions.
- Utilize your instructor's, teaching assistant's, and learning assistants' office hours or make appointments to meet with them at other times.
- Meet with your laboratory partners outside of class to complete the laboratory reports.

Schedule

PHY 150 Physics I: Mechanics								
Spring 2015								
Date	Day	Week	Class	Topic	Chapter	Section	MasteringPhysics	Quiz
12-Jan	M	1	1	Introduction to Physics	1	1-3	Intoduction to Mastering Physics	
14-Jan	W		2	Units and Vectors	1	4-6	Math Review I	Quiz 1
16-Jan	F		3	*Lab 1: Marble Spectrometer*			Math Review II	
19-Jan	M	2		MLK Day				
21-Jan	W		4	1D Motion	2	1, 2, 3	Ch 01 HW	Quiz 2
23-Jan	F		5	*Lab 2: Propagation of Uncertainties*			Math Review III	
26-Jan	M	3	6	1D Motion	2	4, 5, 6	Ch 01 HW	
28-Jan	W		7	2D, 3D Motion	3	1-3		Quiz 4
30-Jan	F		8	*Lab 3: 1D Motion (Qualitative)*				
2-Feb	M	4	9	2D, 3D Motion	3	4, 5	Ch 02 HW	
4-Feb	W		10	Relativity	*	*		Quiz 4
6-Feb	F		11	*Lab 4: 1D Motion (Quantitative)*				
9-Feb	M	5	12	Relativity	*	*		
11-Feb	W		13	Newton's Laws	4	1-3	Ch 03 HW	Quiz 5
13-Feb	F		14	*Lab 5: 2D Motion*				
16-Feb	M	6	15	Newton's Laws	4	4-6		
18-Feb	W		16	Applications	5	1, 2	Ch 04 HW	Quiz 6
20-Feb	F		17	*Lab 6 Springs and Energy*				
23-Feb	M	7	18	Applications	5	3, 4		
25-Feb	W		19	Work and Energy	6	1, 2	Ch 05 HW	
27-Feb	F		20	*Lab 7: Introduction to VPython*				
2-Mar	M	8	21	Exam 1: Chapters 1-5				
4-Mar	W		22	Work and Energy	6	3, 4		
6-Mar	F		23	*Lab 8: Computer Model of a Spring*				
9-Mar	M	9		Spring Recess				
11-Mar	W							
13-Mar	F							
16-Mar	M	10	24	Potential Energy; Cons.	7	1-5	Ch 06 HW	
18-Mar	W		25	Momentum	8	1-3	Ch 07 HW	Quiz 7
20-Mar	F		26	*Lab 9: VPython Orbits*				
23-Mar	M	11	27	Momentum	8	4, 5 (6)		
25-Mar	W		28	Rotation	9	1-4	Ch 08 HW	Quiz 8
27-Mar	F		29	*Lab 10: Impulse*				
30-Mar	M	12	30	Rotation	9	5, 6		
1-Apr	W		31	Rotational Dynamics	10	1-4	Ch 09 HW	Quiz 9
3-Apr	F		32	*Lab 11: Rotational Motion*				
6-Apr	M	13	33	Rotational Dynamics	10	5-7		
8-Apr	W		34	Equilibrium; Elasticity	11	1-3	Ch 10 HW	
10-Apr	F		35	*Lab 12: Orbital Motion*				
13-Apr	M	14	36	Exam 2: Chapters 6-10				
15-Apr	W		37	Equilibrium; Elasticity	11	4, 5		
17-Apr	F		38	*Lab 13: Simple Harmonic Motion*				
20-Apr	M	15	39	Gravitation	12	1-4	Ch 11 HW	
22-Apr	W		40	Gravitation	12	5-8		Quiz 10
24-Apr	F		41	*Lab 14: To Be Determined*				
27-Apr	M	16	42	Periodic Motion	13	1-4	Ch 12 HW	
29-Apr	W		43	Periodic Motion	13	5-8		Quiz 11
1-May	F		44	Wrap-Up	15	5-8	Ch 15 HW	Last Class
6-May	W			Final Exam (7:30-9:20 AM): Chapters 1-13; 15				

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