



Independent Study | in Idaho

PHYS 111
General Physics I

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Course Guide

Independent
Study | in Idaho

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Physics 111 General Physics I

University of Idaho
3 Semester-Hour Credits

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Phys 111: General Physics I

3 Semester-Hour Credits: UI

Welcome!

Whether you are a new or returning student, welcome to the Independent Study in Idaho (ISI) program. Below, you will find information pertinent to your course including the course description, course materials, course objectives, as well as information about assignments, exams, and grading. If you have any questions or concerns, please contact the ISI office for clarification before beginning your course.

Policies and Procedures

Refer to the ISI website at www.uidaho.edu/isi and select *About ISI Policies* for the most current policies and procedures, including information on setting up accounts, student confidentiality, exams, proctors, transcripts, course exchanges, refunds, academic integrity, library resources, and disability support and other services.

Course Description

Kinematics, forces and dynamics, conservation laws, thermodynamics, waves.

Prerequisite: Math 143 (Pre-calculus Algebra and Analytic Geometry). U of I students: may be used as core credit in J-3-b as natural and applied sciences.

This course does not include a lab component.

Required: scientific calculator

5 graded lessons, 11 self-study lessons, 4 proctored exams

Course Materials

Required Course Materials

- Cutnell, John D., and Kenneth W. Johnson. *Physics*. Vol. 1 (paperback). 9th ed. John Wiley & Sons, Inc., 2012. ISBN-13 978-0-470-87953-5

Course Delivery

All ISI courses are delivered through Canvas, an online management system that hosts the course lessons and assignments and other items that are essential to the course.

Course Introduction

Physics is the study of how things work. Physics covers just about everything from technology to medicine, biology, sports, engineering, philosophy, cosmology, and psychology. There are many reasons for studying physics. Many other fields (e.g., engineering, architecture, sports medicine, biology, medicine) make use of the basic ideas of physics. Instrumentation, electronics, and computers find wide application and they all involve physics.

Studying physics will improve your ability to think. You will learn to use abstractions, models, theories, and hypotheses. You will learn the process of problem solving, and your skill in mathematics will increase significantly. You will gain self-confidence. Learning about the laws of physics and how our universe is put together will help you form a worldview based on fact and reality. You will gain a better appreciation of the aesthetic beauty of the world in which we live. Studying physics is like getting a chance to see in full color instead of just black and white.

Finally, and perhaps most important of all, you will find that studying physics can be a lot of fun. You will likely find you are better at it than you thought.

Course Objectives

- To give you an understanding of the fundamental physical laws that describe our universe
- To enable you to apply the laws of physics to your everyday world; it is hoped this will be of practical value in many ways, ranging from repairing a toaster to buying a new car.
- To help you be a better citizen through acquiring the "scientific literacy" needed to understand the many crucial public issues that are so critically dependent on science and technology
- To develop in you the ability to think logically and analytically; one aspect of this skill is the ability to solve problems and to think quantitatively and in mathematical terms.
- To provide you with an appreciation of the philosophical consequences of science and of how science has influenced and continues to influence the evolution of humanity and civilization

Lessons

Each lesson includes the following components:

- Reading assignment
- Self-study assignment
- Written assignment

The lesson assignments are listed in the *Assignment Submission Log* in this study guide.

Reading Assignments

Read the chapter indicated for each of the lessons. You may omit the following sections: 3.4, 5.7, 7.4, 8.7, 10.7, 10.8, 11.11, 12.9, 12.10, 16.4, 16.8, and 16.11.

Self-Study Assignments

Some of the questions and problems in lessons 1-16 are labeled "self-study." These questions and problems are found in your textbook, in the *Conceptual Questions and Problems* sections at the end of each chapter. Answers and solutions to these are provided in *Solutions to Self-Study Assignments*, located on Canvas. The self-study assignments will not be graded, but they must be turned in. When submitting them with the written (graded) assignments, please place the corresponding self-study assignment at the beginning of the lesson. Attempt to solve these problems on your own, but if you get stuck, look at the solution provided. As a last resort you may simply copy the solution, but you will not learn much if you do this.

Written Assignments

It is very important that you do a good job on the homework lessons. You should carefully read each chapter before attempting the assigned problems in the *Focus on Concepts/ Questions and Problems* sections. It is usually best to read the chapter twice. First go through it without working out all the details. Then go back a second time and reread all the material and work through the examples. Only then should you tackle the assigned problems. Try to answer as many of these as you can. These are similar to the questions on the examinations. Answers to odd-numbered problems are given at the back of the book, so if you have trouble, try working a problem for which the answer is given. You will find that problems in the text are often included as adjacent pairs, which are similar.

Study Hints

- Keep a copy of every lesson submitted.
- Complete all assigned readings.
- Set a schedule allowing for completion of the course one month prior to your desired deadline. (An Assignment Submission Log is provided for this purpose.) Show all of your work. Work neatly. Show the equations used before substituting in numbers. Draw good diagrams using a straight-edge ruler. This is important.

- Give answers in the form of an equation, e.g., $x = 3.98\text{m}$. Round most answers to three significant figures. Be sure to give the units of the answer (i.e., meters, seconds, kilograms). Enclose your answer in a box. Don't crowd your work.
- Show all of the steps in your work. Work from the top of the page down, not from left to right. Experience shows that students who work neatly and systematically seem to gain a better understanding of the subject. Do not skip steps or try to do too much algebra in your head. Try to follow the methods used in the textbook and self-study examples.
- You should have a pocket calculator with trigonometric functions and exponential notation. A solar-powered calculator is economical.

Exams

Four exams are given. Exams 1, 2, and 3 are unit exams, each covering one-fourth of the course content.

Exam 4, the final examination, is comprehensive.

- Exam 1 covers lessons 1-5 and chapters 1-4. You can take exam 1 after you have submitted the assignments associated with lessons 1-5.
- Exam 2 covers lessons 6-9 and chapters 5-7. You can take exam 2 after you have submitted the assignments associated with lessons 6-9.
- Exam 3 covers lessons 10-13 and chapters 8-11. You can take exam 3 after you have submitted the assignments associated with lessons 10-13.
- Exam 4, the final exam, covers all of the material covered in the course with some emphasis on chapters 12, 13, and 16. You can take exam 4 after you have submitted the assignments associated with lessons 14-16.
- Exams 1, 2, and 3 are designed to be completed in 50 minutes.
- Exam 4 is intended to be completed in 2 hours. However, for all exams, so that you do not feel time pressure, you are allowed to take up to double time.
- You must wait for grades and comments on lessons prior to taking each subsequent exam.
- For your instructor's exam guidelines, refer to the email sent to you with your receipt and the Exam Information sections in this course guide.
- To each examination you should bring a nonprogrammable calculator and a straight-edge ruler.

You are not required to memorize numerous formulas. With each exam is provided a sheet of equations you will need. Some fundamental equations are not given (e.g., basic trig relations for sine and cosine, or the Pythagorean theorem). This equation sheet is provided toward the back of this study guide. You should study it in advance of taking an exam so that you are sure what the symbols mean. You also must know which equation to use in a given problem. If some basic relations are omitted from the sheet, you are expected to know these on your own. Values of needed constants are provided.

Partial credit may be given even if the final answer is incorrect, so it is important that all work be shown. Further, no credit will be given for a problem for which no work is shown, *including* multiple-choice questions.

There is no penalty for a wrong guess on a multiple-choice question, so answer all questions. Mark the one best answer in each case. Many multiple-choice questions are based on the qualitative questions at the end of each chapter, and some may be based on drawings or illustrations in the text.

Sample exams are provided on Canvas. The format and content of these may differ slightly from the exams you will take, but they are similar to yours in scope and difficulty. It is a good idea to try these for practice before you take an exam.

A final exam review sheet is included this study guide following Lesson 16.

Proctor Selection/Scheduling Exams

All exams require a proctor. To submit your *Proctor Information Form* online, visit the ISI website and select *Forms, Proctor Information Form*. Submit this form at least two weeks before your first exam. Refer to *About ISI Policies* on the ISI website for information on acceptable and unacceptable proctors.

Grading

Grades are assigned on the basis of the total points earned on the lessons and exams and the completion of the self-study assignments. The final exam is 200 points, which is a third of the final grade. The points are distributed as shown here:

Lessons/Exams	Points	Breakdown of Points
Lessons	100	
Exam 1	100	10 multiple-choice questions (50 points); 3 problems (50 points)
Exam2	100	10 multiple-choice questions (50 points); 3 problems (50 points)
Exam3	100	10 multiple-choice questions (50 points); 3 problems (50 points)
Final Exam	200	31 multiple-choice questions (155 points); 3 problems (45 points)
Total Points	600	

A typical exam grading scale is as follows:

Exam Grade	Percentage Earned
A	85%
B	72%
C	60%
D	50%

In assigning a course grade, the instructor will try to evaluate your progress in the course. For example, if your score on the comprehensive final exam (Exam 4) is 20%, you will probably receive a grade of F even if your overall average is higher than 50%. On the other hand, if your overall average is low but you score 80% on the final exam, you will probably receive at least a C for the course.

Any cheating is considered a very serious transgression and may result in a grade of F for the course. The final course grade is issued after all lessons and exams have been graded.

The Grading Scale for the final grade is as follows:

Grade	Percentage Earned
A	90%
B	80%
C	70%
D	60%
F	Less than 60%

About the Course Developer

The original course guide was prepared by Mike Browne. A revision of the course guide was completed by Dr. Blaise-Alexis Fouetio Kengne in 2014.

Dr. Browne was a retired professor of physics, who taught this course for many years at the University of Idaho campus in Moscow. He went to school at the University of California, Berkeley, and received a B.S. in

1952 in engineering, and a Ph.D. in 1955 in physics. He was engaged in basic research and management at Lockheed Research Labs prior to coming to the University of Idaho in 1967. He was involved in administration and did research in solid state physics and science education. Teaching was what he enjoyed most, and he continued teaching on a limited basis since retiring in 1995. He loved physics and learning new things. He hoped that you would find physics as much fun as he did. He believed that studying physics was a good way to learn to think. He believed that this was not a vocational course, but it would help you wherever your path in life leads. Remember, thin paper weighs less, and you can't fall off of the floor.

Dr. Blaise-Alexis Fouetio Kengne completed his coursework and earned his Ph.D. from the University of Idaho in September 2014.

Contacting Your Instructor

See the *Course Rules* in your course in Canvas for Instructor contact information.

Assignment Submission Log

Lesson	Chapter	Self-Study Assignments Questions/Problem s	Graded Assignments Questions/Problems	Assignment Submitted/Score	
1	1	Q: 6, 12, 15 P: 2, 19, 23, 44	Q: 2, 11, 17 P: 14, 31, 41, 50, 53		
2	2	Q: 1, 3, 6, 13, 22, 24 P: 8, 11, 21, 23,34,39,54,57,63,66	None		
3	3 (omit 3.4)	Q: 1, 3, 4, 6, 9 P: 1, 6, 11, 13, 18, 21, 26, 37, 44, 46	None		
4	4	Q: 1, 9 P: 2, 15, 32, 39	Q: 5, 8, 12 P: 7, 18, 24, 37, 48		
5	4	Q: 13, 15, 16, 23 P: 45, 60, 64, 77, 81, 83, 89	None		
It is time to take Exam 1.					
6	5 (omit 5.7)	Q: 1, 3, 7, 8, 10, 11, 15 P: 5, 7, 11, 13, 18, 24, 30, 31, 40	None		
7	6	Q: 1, 9, 11, 14 P: 4, 6, 10, 14, 21, 28, 29, 34	None		
8	6	Q: 21, 22 P: 39, 45, 56, 63	Q: 8, 25 P: 41, 50, 60, 70		
9	7 (omit 7.4)	Q: 1, 2, 6, 10, 13, 17 P: 2, 14, 16, 19,23,27,28,30,47,52, 64	None		
It is time to take Exam 2.					

Lesson	Chapter	Self-Study Assignments Questions/Problem	Graded Assignments Questions/Problems	Assignment Submitted/Score	Lesson
10	8 (omit 8.7)	Q: 1, 4, 6, 10, 13, 15 P: 3, 14, 17, 31, 38, 44, 46, 48, 60	None		
11	9	Q: 3, 8, 10, 13, 17 P: 3, 8, 11, 26, 56	Q: 1, 6, 12, 16 P: 2, 18, 29, 54, 61		
12	10 (omit 10.7, 10.8)	Q: 2, 4, 13, 14, 16, 17 P: 2, 6, 15, 20, 32, 40, 42, 46, 49	None		
13	11 (omit 11.11)	Q: 1, 4, 10, 12, 13, 16, 18 P: 2, 8, 11, 13, 23, 32, 36, 39, 40, 51, 60	None		
It is time to take Exam 3.					
14	12 (omit 12.9, 12.10)	Q: 2, 6, 9 P: 12, 28, 39	Q: 1, 4, 7, 10, 13 P: 3, 27, 46, 51		
15	13	Q: 1, 2, 4, 6, 8, 10, 11 P: 2, 14, 16, 18, 21	None		
16	16 (omit 16.4, 16.8, 16.11)	Q: 2, 3, 6, 11, 12, 18 P: 3, 7, 16, 23, 34, 42, 79	None		
It is time to take the Final Exam.					

Lesson 1 Introduction and Mathematical Concepts

Reading Assignment

Cutnell: Chapter 1

Self-Study Assignment

Cutnell: *Focus on Concepts* and *Problems*

Questions: 6, 12, 15

Problems: 2, 19, 23, 44

Note: For answers to self-study questions/problems see *Solutions to Self-Study Assignments*, located toward the back of this study guide.

Written Assignment

Cutnell: *Focus on Concepts* and *Problems*

Questions: 2, 11, 17

Problems: 14, 31, 41, 50, 53