

Physics 160 - College Physics I

Instructor:

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Office Hours: See information on-line at <http://www.mnstate.edu/lindaas>

Official Course Description:

Concepts and principles of elementary physics presented in a guided activity-based format which integrates lecture and laboratory using cooperative group learning techniques. Includes kinematics and mechanics.

Prerequisites:

Knowledge of algebra and trigonometry is required for this course. In terms of courses at MSUM the appropriate mathematical level is either Math 127 and Math 143 (College Algebra and Trigonometry) or Math 142 (Pre-Calculus). If you have questions about the mathematical rigor expected this semester, please speak with Dr. Lindaas.

Required Texts: Please see directions on purchasing on the course website.

- College Physics, a strategic approach, 2nd Edition by Knight, Jones and Field, Published by Addison Wesley/Pearson.
- Student Workbook for College Physics, a strategic approach, 2nd Edition by Knight, Jones and Field, Published by Addison Wesley/Pearson
- Mastering Physics – Purchase an access code and use course ID **PHYS160LINDAAS001522**
- Physics 160 Lab Activity Book.

Required Supplies:

- Lab Notebook. I recommend a quad-ruled spiral or bound notebook but a regular spiral notebook will also work. You do not need to buy the really expensive hard cover lab notebooks – less expensive options actually work better for what we will be doing.

Note on textbooks: Volume 1 is used during the first semester and Volume 2 is used the second semester. There are many options available from separate volumes, one complete text with both volumes as well as just using the e-book that comes with your Mastering Physics access.

Course Objectives / Student Learning Outcomes:**Physics Content Covered**

- Participants will become familiar with a variety of physics concepts including Newton's Laws, work, energy, momentum, frames of reference and oscillations.
- Participants will develop critical thinking skills.
- Participants will develop estimating and unit analysis skills.
- Participants will participate in inquiry-based experiences.
- Participants will become familiar with the scientific method.
- Participants will develop laboratory skills and technical writing skills
- Participants will develop data analysis and error analysis within a laboratory experiment.

Dragon Core –Student Learning Outcomes Extended from the Inner Cluster Foundation

- **Mathematics (Foundation)**
 - Determine whether arguments are valid.
 - Solve real-life problems by using the principles of set theory.
 - Make decisions regarding the possible events that are governed at least in part by chance.
 - Apply the basic concepts of statistics, such as collecting data; drawing graphs; finding measures of average, variation, and position; and solving problems using the standard normal distribution.
 - Demonstrate understanding of selected concepts in logic, set theory, probability, and statistics by solving a real-life problem and communicating their work to the class orally and/or in writing.

Dragon Core – Student Competencies Developed:

- **Natural Sciences (Competency Area 4)**
 - Demonstrate an understanding of the scientific method and of the relationship between hypotheses and theories.
 - Recognize and define problems and formulate and test hypotheses using data collected by observation or experiment. One project must develop, in greater depth, students’ laboratory or field experience in the collection of data, its quantitative and graphical analysis, its interpretation, its reporting, and an appreciation of its sources of error and uncertainty.
 - Exhibit knowledge of the development and contributions of major scientific theories.
 - Demonstrate knowledge of the concepts, principles, problems, and perspectives of one or more specific scientific disciplines.
 - Consider societal issues from natural science perspectives, making informed judgments by assessing and evaluating scientific information.

Evaluation:

Each component of the course counts as follows –

		Exams		
Homework	Labs	Unit Tests	Class Problems and Quizzes	Final
20%	30%	27%	5%	18%

Grades will be assigned on the absolute scale below; plusses and minuses will be used for the top or bottom quarter of a bracket.

A	B	C	D	F
100-90%	89-80%	79-70%	69-60%	< 60%

- **Homework:** Homework problems will be assigned from the text and graded through Mastering Physics. You are encouraged to work in groups, but the homework solutions must be your own. In general, late homework will not be accepted. MAKE SURE YOU KNOW WHEN ASSIGNMENTS ARE DUE.

- **CBA Labs:** The lab is an extension of our classroom. In fact, you could say it really is our classroom. The lab provides you with an arena where you are free to explore and familiarize yourself with the concepts we are learning. You will be expected to keep a lab journal (aka notebook) and turn-in lab write-ups/summaries. There will be 3 components to every lab:

Level	Purpose	Summary
C	Conceptual understanding	Conceptual Diagram and Explanation
B	Basic Experimental measurement	Graph showing quantitative relationship
A	(Advanced) Extended lab exercise	Additional relationship or analysis (error)

- Each component will be graded on the following scale
1=poor, 2=needs improvement, 3=good, 4=excellent
 - A group must receive a 3 at the C-level to receive credit for B-level work
 - A student must receive a 2 at the B-level to receive credit for A-level work
 - The lab score is given by $5*(C)+3*(B)+2*(A)+42$. There is no credit given for missed labs. The lab score is weighted towards the C-level.
 - You are expected to come to lab with a conceptual diagram and ideas already written in your lab journal. You will lose a C-level point if you are not prepared.
- **Exams:** Exams will consist of several questions similar to homework problems as well as questions based on your knowledge of lab activities. Partial credit will be given, but only if what you have written is logical and well organized. Make up exams will be given only in cases of documented emergencies.
- **Class Problems:** You will be working with your lab partners to solve group problems approximately once a week. Every few weeks the problem will be graded. No make up problems will be given.
- **Quizzes:** Periodically throughout the semester quizzes will be given. These quizzes may focus on activities/results you have covered in a lab or on homework or in-class problems. You will be allowed to use your lab book during lab quizzes. Hence, you are strongly encouraged to utilize good experimental technique and actually write in your lab book. No make up quizzes will be given.
- **Attendance:** Attendance at all class meetings is expected. You will be working in groups on many activities, so your absence hurts your classmates as much as it hurts you. It is also difficult to get started if you are late. There is a high correlation with attendance and understanding what you are doing.
- **Academic Honesty:** Your education is only as good as your integrity. If you have any questions as to what is acceptable behavior see the instructor or review the MSUM Student Academic Policy in the Student Handbook: <http://www.mnstate.edu/sthandbook/> (under Student Policy Info).

Class Schedule:

Lecture: Monday, Wednesday, Friday	(Everyone) 10:30 – 11:20 am	SLB 118
Lab: Tuesday and Thursday	Section times vary	Hagen 323
We will get our hands “messy” in lab. However, the ABC lab format means that your brain has to come prepared and ready to work also.		

Course Web Site:

<http://www.mnstate.edu/lindaas/>

THIS COURSE MAKES USE OF THE INTERNET TO DISTRIBUTE COURSE MATERIALS (HOMEWORK, SOLUTIONS, ETC.). IF YOU ANTICIPATE HAVING DIFFICULTY ACCESSING THE INTERNET, PLEASE SEE DR. LINDAAS AS SOON AS POSSIBLE.

Special Accommodations:

Students with disabilities who believe they may need an accommodation in this class are encouraged to contact Greg Toutges, Coordinator of Disability Services at 477-5859 (voice) or 1-800-627-3529 (MRS/TTY), CMU 114 as soon as possible to ensure that accommodations are implemented in a timely fashion.