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**Ohio Articulation Number (OAN)  
Course Submission Form  
2005-2006**



College/University Youngstown State University

Course(s) Submitted(Title & Course #) Fundamentals of Physics Laboratory 1 for

Ohio Articulation Number OSC 014

Date 5/19/06 Course Phys. 1501L of a 2 of 2 Course OAN mapping.

Name and title of individual submitting on behalf of the college/university

Name William Sturuss Title Chair Department of Physics & Astronomy

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Credit Hours 1 qtr \_\_\_\_\_ sem X

Lecture Hours \_\_\_\_\_

Laboratory Hours 1 (if applicable)

Pre-Requisites(s) Course work : PHYS 1501

Placement Score:

(Domain) \_\_\_\_\_ (Score) \_\_\_\_\_

Catalog/Course Description (Includes Course Title and Course #)

<p>1501L. Fundamentals of Physics Laboratory 1. Experimental work designed to supplement the PHYS 1501, 1502 sequence. Two hours per week. Prereq. or concurrent: PHYS 1501 for 1501L. <span style="float: right;">3 S.H.</span></p>
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Texts/Outside Readings/Ancillary Materials

The Physics Lab Manual 1: Experiments to Accompany Physics 1501  
Laboratory – Youngstown State University

Course Objectives and/or Plan of Work

The primary objectives of this laboratory course are:

- to illustrate the physical principles covered in the lecture course.
- to familiarize students with basic laboratory equipment and proper laboratory technique.
- to gain experience in data analysis and reporting of experimental results.
- to develop group problem solving and interaction skills.

This course is a General Education course in the Natural Sciences Domain and emphasizes general education goals: (2) acquiring, processing, and presenting quantitative and qualitative information using the most appropriate technologies, including computers; (3) reasoning critically, drawing sound conclusions, and applying those conclusions to one's life and society; (6) understanding the scientific method, forming and testing hypotheses as well as evaluating results; (7) realizing the evolving relationships among science, technology, and society; and (13) understanding and appreciating the natural environment and the processes that shape it.

Description of Assessment and/or Evaluation of Student Learning

Understanding and/application of the following topics using algebra and trigonometry concepts and methods where appropriate:

1. Kinematics – one and two dimensional
2. Vectors – vector Arithmetic
3. Force and Newton's Laws of Motion
4. Work, Energy, Conservation of Energy
5. Linear momentum
6. Collisions
7. Rotational kinematics and dynamics
8. Angular momentum and rotational energy
9. Simple harmonic motion
10. Waves and sound
11. Solid and fluid properties

Master Syllabi and Working Syllabi (if both are used)

**Physics 1501L Syllabus**  
**Fundamentals of Physics Laboratory 1**

**Text:** *The Physics Lab Manual I: Experiments to Accompany Physics 1501  
Laboratory - Youngstown State University*

Prereq. or Concurrent Phys 1501

### **Course Objectives:**

The primary objectives of this laboratory course are:

- to illustrate the physical principles covered in the lecture course.
- to familiarize students with basic laboratory equipment and proper laboratory technique.
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- to develop group problem solving and interaction skills.

### **Learning Outcomes**

1. Kinematics – one and two dimensional
2. Vectors – vector Arithmetic
3. Force and Newton's Laws of Motion
4. Work, Energy, Conservation of Energy
5. Linear momentum
6. Collisions
7. Rotational kinematics and dynamics
8. Angular momentum and rotational energy
9. Simple harmonic motion
10. Waves and sound
11. Solid and fluid properties

### **Lab Groups:**

Students will work in groups of 3 or 4. Groups of 5 or more are not permitted. All members of the groups are required to participate in conducting the experiments, and collecting and analyzing the data. If you are not present for the experiment or do not participate in conducting the experiment you will be required to do a make-up lab. Each group will select a secretary each week to organize the group and prepare the report for the group. Each member of the group must perform the secretarial duties at least twice during the semester. **Failure to fulfill that duty will result in a drop of one letter grade in the final grade.**

### **Check Out Procedure:**

Before leaving the lab, each group (all members) must show their data to the instructor in order to demonstrate that they have completed the experiment correctly and have sufficiently good data to complete the lab report. In order to check out you must have neat, legible, clearly labeled data and at least rough calculations and graphs of the results of the experiment. Failure to check out on any given experiment will result in a penalty of 10% of the total grade for that experiment.

### **Lab Reports:**

Lab reports are due at the **beginning** of the next class after the experiment was done. There is a late penalty of 5% of the total possible grade for each day that the report is late. All members of the group should ensure that they have read and understood the lab report before it is submitted. Lab reports may be typed or handwritten. If they are handwritten they must be written **neatly**. I can't grade what I can't read.

**The lab report should include the following items:**

1. Title page: This must include the title of the experiment, the date the experiment was conducted, the date the report was due, and the names of all members of the group with the secretary's name clearly indicated.
2. Purpose: **Do not copy the lab manual!** This section of the report should explain the intended goal of the experiment. It should be no more than 2 or 3 sentences in length. No description of the procedure is necessary.
3. Data, Calculations and Results: The data should be neatly tabulated in the body of the report and should be clearly labeled. **Do not** refer to question numbers or procedure instruction numbers in the manual as a proper lab report should be easily readable by someone who has never seen the lab manual. The data table may include the results of the calculations if you wish, but sample calculations must still be included. You do not need to show every calculation, one sample of each type of calculation is sufficient. **All data and results must include their associated uncertainties.** Any graphs should also appear in this section of the report.
4. Analysis: This section is where you draw conclusions based on your data. You should also be sure that all questions posed in the lab manual are answered here. The answers should not refer back to question numbers in the lab manual and the answers should be phrased in such a way that the reader does not need the lab manual to understand what is being discussed. In this section you should also discuss any factors which would cause the results to be uncertain or in error which you could not include in your uncertainty calculations.
5. Summary: The final section of the report should be a brief summary of the results of the experiment. It should refer back to the purpose of the experiment. For example, if the purpose of your experiment were to measure the acceleration of gravity, the summary of your report should include the value of the acceleration that you determined and whether or not it agrees with the accepted value within uncertainty.
6. Signature page: The last page of the report should contain a statement to the effect that all members of the group have read the report and agree with all of its contents. It should also contain the legibly printed or typed names of each member of the group and their signatures.

**Make-ups:**

Each student must attend (and participate in) each experiment. If for some reason you are unable to attend a lab session, contact me in AS SOON AS POSSIBLE (preferably ahead of time) to arrange a make-up time. When doing a make-up lab, you must check in with the instructor, complete the experiment, and submit an individual report based on your data. This individual report will count as one turn as secretary. There will be absolutely **no exceptions** to this policy.

**Grading:**

Each report will be graded out of 100 points. All reports will be weighted equally. The final grades will be assessed on the following scale:

90-100%	A
80-89.9%	B
70-79.9%	C
60-69.9%	D
0-59.9%	F

**EXIT EXAM:** All students are now required to take an exit exam which covers basic mathematical skills such as measurement and graphing, precision, accuracy, uncertainty calculations, error analysis, unit conversions, and significant figures. Students must attain a passing grade on this exit exam in order to receive a passing grade for this class, regardless of the performance level on the other aspects of the lab. There are two web tutorials (Graphing and Uncertainty tutorials) which should help you master the skills required at <http://cc.yzu.edu/physics-astro/Clymer.htm> .

**Academic Dishonesty:**

Any student found to be cheating plagiarizing or committing any other type of academic dishonesty is in violation of the YSU Code of Student Conduct. The consequences for this type of violation are at the discretion of the instructor and may include a failing grade on the project, paper or exam, a failing grade in the course, and/or additional sanctions. Further information on this subject is available in the YSU Undergraduate Bulletin.

**Disabilities:**

In accordance with University procedure, if you have a documented disability and you require accommodations to obtain equal access in this course please contact me privately to discuss your specific needs. You must be registered with the Center for Student Progress (CSP)/Disability Services Office located at Wick House (on the corner of Wick Avenue and the Access Road) and provide a letter of accommodations to verify your eligibility. You can contact the CSP/Disability Services at 330-941-1372.

**Other notes:**

This course is a General Education course in the Natural Sciences Domain and emphasizes general education goals: (2) acquiring, processing, and presenting quantitative and qualitative information using the most appropriate technologies, including computers; (3) reasoning critically, drawing sound conclusions, and applying those conclusions to one's life and society; (6) understanding the scientific method, forming and testing hypotheses as well as evaluating results; (7) realizing the evolving relationships among science, technology, and society; and (13) understanding and appreciating the natural environment and the processes that shape it.

Additional Documentation

Youngstown State University  
 PHYS 1501L Experiment Topics  
 Introductory Algebra/Trigonometry Sequence

Week 1:	<b>Measurement Precision &amp; Distribution Lab</b>
Week 2:	<b>Free Fall &amp; Gravitational Acceleration Lab</b>
Week 3:	<b>Empirical Relations: Free Fall Time Lab</b>
Week 4:	<b>Kinematics in Two Dimensions: Projectiles Lab</b>
Week 5:	<b>Vectors: Forces &amp; Static Equilibrium Lab</b>
Week 6:	<b>Rotation &amp; Newton's Second Law Lab</b>
Week 7:	<b>Mandatory Lab Exam</b>
Week 8:	<b>Statics, Dynamics &amp; and Friction Lab</b>
Week 9:	<b>Ballistic Pendulum Lab</b>
Week 10:	<b>Lab Make-up Week</b>
Week 11:	<b>Energy Conservation in Rotation Lab</b>
Week 12:	<b>Oscillating Mass-Spring System Lab</b>
Week 13:	<b>Standing Waves &amp; the Stretched String Lab</b>
Week 14:	<b>Standing Waves &amp; the Speed of Sound Lab</b>
Week 15:	<b>Lab Make-up Week</b>

OBR Use

Action

Approved	
Additional Information Requested	
Rejected	
Date	