PHYS 1114-College Physics I
Course Syllabus

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Prerequisite:	MATH 1513 or MATH 1233
Class Section:	1114-004
Meeting Time:	1:00-2:50pm M,W in room 1C8 Group Laboratory Mon. 3:00-4:50, room 1B2
Meeting Location:	1C8 Main Building

N.B.: Any of the information in this syllabus may change in the event of extenuating circumstances

Accommodations for Students with Special Needs

Oklahoma City Community College complies with Section 504 of the Rehabilitation Act and the Americans with Disabilities Act. Students with disabilities who seek accommodations must make their request by contacting the office of Services to Students with Disabilities, (405) 682-7520 (v/tty). Additional information may be obtained from www.okccc.edu/disability

Objective of this course:

You will demonstrate your understanding of useful concepts of kinematics and dynamics, energy and momentum, waves and sounds, fluids, and thermodynamics by 1) developing numerical and graphical descriptions of physical phenomena, 2) numerically predicting the results of physical occurrences, and 3) applying laboratory skills to analyze real situations. Numerical computations will utilize algebra and basic trigonometry where appropriate.

Outline:

This is the first half of a 2-semester sequence. This course will be organized as follows:

UNIT	CONTENT	TEXT CHAPTERS
I	Unit Conversions &Vector Algebra	1,3
II	Kinematics	2,3
III	Newton's Laws	4
IV	Conservation Laws	5,6
V	Circular/Rotational Motion and Gravitation	7,8
VIII	Waves and Sound	13,14
VI	Properties of Materials	9,10
VII	Thermodynamics	11, 12

Attendance and Class Expectations:

Here are a few guidelines for the semester

- An attendance will be taken beginning of each class meeting, as accurate attendance records are required. Although there is no grade for attendance, Physics I is a class that moves at a fairly rapid pace so there is a lot of information passed on in every class meeting. If you miss, please make arrangement with someone in the class to obtain the information from that class. ***Also, please refer to individual sections regarding makeup of missed classwork.***
- As a school policy, I can no longer withdraw a student for non-attendance. Therefore, if you stop coming to class, ***it is your responsibility to withdraw from this course.*** If you remain on the roll at the end of the semester, you will have to receive a letter grade (that you probably will not enjoy).
- Labs and Homework assignments are due at the ***beginning*** of the class period. ***Any assignments turned in after this point will be considered late.***
- Excused absences consist of illness (your own or an immediate family member), family emergency, inclement weather, military duty, and jury duty or other extenuating circumstances. You will be allowed and expected to make up work missed due to such absences. Please notify me prior to the absence in applicable cases or as soon as possible after the absence so that arrangements can be made. Documentation of some sort is expected to verify such absences.
- Unexcused absences will result in work missed being counted as late. Late work is discussed later in the appropriate section.
- I realize that many of you may work and there may on occasion be extenuating circumstances due to your employment. However, since you are enrolled in this course, you know the scheduling constraints. Therefore, 1 work-related absence per semester will be allowed as excused. Subsequent absences will be unexcused.
- Work will always be accepted early!
- **Please ask if you have questions during class!** Even though you may feel that you are the only one not understanding something, chances are most people would benefit from have a point of confusion explained again.

Academic misconduct (cheating):

DO NOT CHEAT!!!! Do your own work, don't share information on exams, etc. Just don't do it! It is disrespectful to your school, your classmates, yourself, and especially an affront to your teacher. If you are caught cheating, an incident report will be filed with the dean and consequences will follow according to the guidelines set forth by the College. Cheating is a very serious offense and can result in failure in the course.

Exams:

The exams are closed book, closed note, unless otherwise stated. I will assign a maximum point value for each problem or question on the unit assessments. Written tests will normally be completed during class meeting hours on scheduled dates and announced in class. Pocket calculators are allowed, but you cannot share them. Programmable calculators are *not* allowed *unless* the memory is cleared out. Since I will be assigning partial credit on some problems, you must present complete, clear solutions to the problems, and show all of your work. Legibility is important: if your cannot be easily decyphered it might receive no credit. To receive all credit for your solution also please be certain to answer in the appropriate units. Questions are permitted

during the exam and if something is not clear please ask!

If an exam is missed without a valid excuse, the exam must be taken in the test center within 4 calendar days and with a penalty of 5% **per day**, (minimum 10% loss). With a valid excuse, please take the exam within 5 calendar days. Exams will be placed in the test center on the same day as the test if I notice anybody missing.

A score of 60% mastery is required on all unit material. If you score less than 60% on an exam, you will be required to retest within two weeks. The maximum score on a retest is 60% and the retest score will replace the previous grade, regardless if it is higher or lower. You may only retest once on each unit. Because the material tends to be cumulative, a student who takes a retest but again scores below 60% will be requested to withdraw from the class and try again later.

All class exams are equally weighted, since each is worth 100% regardless of actual point value.

Homework:

Homework will be assigned for each unit. These problems will be collected **at the exams and checked for completeness**. A complete homework assignment will receive 10 points. It is important that you at least attempt the problems, even if you have difficulty with them. Practice makes perfect and that especially applies to solving Physics problems. It is fine to form study groups with other students, as long as you really learning and not simply getting answers from others. Late homework that is turned in after you hand in your exam will receive half credit.

Labs:

All labs will be conducted as group on Mondays. Once you have completed the experiment, you will analyze the data and prepare a lab report to submit for grading. *You are strongly encouraged to start analyzing your data before leaving lab so that help is readily available if a problem arises!* **Your data sheet must be checked and initialed by the instructor before leaving lab.** This helps ensure that you have reasonable data. Instructions on how to prepare an appropriate lab write up are included in the lab manual. Also, instructions on how to prepared suitable tables and graphs are in the manual. There is very specific graph paper required for this course. Please use this type of paper or your graphs will be penalized. Please make sure to include the purpose of the experiment, answer the questions in complete, logical sentences, and include all units where necessary. If you are in doubt about your report, *please ask.* It is better to ask a question, even if you think that it is silly, than to lose points! Lab partners are allowed but not required. Each student must collect and analyze the data and submit a written report independently (i.e., your data should be your own, not a copy of your partner's data, unless specifically allowed by the instructor). Labs will be graded on a scale of 1 to 10 and the score is included in the course grade.

If you miss a lab with an excused absence, you must make up the lab independently. (An unexcused absence will result in an automatic late penalty.) However, you must get a written permission slip before going to the science center to perform the lab! The independent lab setups are available for a short time only, so you should sign up ASAP or be forced to wait until the end of the semester (and suffer point loss).

Lab due dates are on the schedule provided. Late work will be penalized 1 point per

week, and labs that are over 2 weeks late will receive no grade but must still be completed.

Grading:

Your grade will depend solely on the quality of your work! You are not competing against the other people in this class.

Exams 70%
Labs 20%
Homework and "Board Points" 10%

A 90-100% of total points
B 80-89%
C 70-79%
D 60-69%

There will be no curve, and no outside-class extra credit assignments will be given.

To determine your grade use the following method:

A. Take each test score and divide by the points possible, which gives you the %. Add your test % up and divide this number by the number of exams. Multiply this number by 70. This is your total exam % out of 70
B. Divide each lab score by 10 (or 30 for mastery lab), which gives you the %. Add your lab % up and divide by the number of labs. Multiply by 20 and this is your lab %
C. Divide each hw score by 10, again getting the %. Add them up and divide by the number of hw assignments and multiply by 10, which give you hw%
D. Add these 3 % together, and you have your current % in the class.

Office Hours:

I will try to set my office hours for maximum availability to students. You may contact me in person, via the telephone or via email during these times. Also, you may contact me via email pretty much any time. *Please make use of my office hours! I am there to help you!*

Materials and Resources:

1. Wilson, J., and Buffa, A., **College Physics**, 5th edition, Prentice Hall Publishing Co., Upper Saddle River, NJ, 2003.
2. Kamm, Steven D., **Laboratory Manual-Phys 1114**

Additional resources:

3) Textbook website: http://cw.prenhall.com/bookbind/pubbooks/wilson
4) Lou, B., **Student Study Guide and Solutions Manual**, to accompany **College** Physics.
5) Schaum's Outline Series, **College Physics**, McGraw-Hill Book Company
6) Laboratory Video Tapes: OKCCC Science Lab

OKLAHOMA CITY COMMUNITY COLLEGE LABORATORY SAFETY

Oklahoma City Community College science laboratories exist to provide you with the opportunity to learn. Whether you do your lab work in a group lab (GP) or individually paced through the Science Center, the same laboratory rules and safety precautions apply. Always follow the instructions given by your instructor/laboratory supervisor.

Some labs require the sharing of equipment and materials. If you should inadvertently break or remove from the laboratory a piece of equipment, you may be preventing other students from completing their lab work. We ask that you exercise care and consideration when handling laboratory equipment.

When you choose the individual pacing (IP) option, you may find yourself working with less supervision. This means that you have a greater responsibility for safety - not only your own, but the safety of others. It is very important that you observe all safety regulations, and help others to do so as well. Please don't think of the laboratory as recreation. Have a productive time learning, but remember THERE ARE HAZARDS WHICH COULD RESULT IN SERIOUS INJURY.

Read the following safety regulations and then indicate with your signature that you understand and agree to comply before beginning any laboratory work.

LABORATORY RULES AND SAFETY PRECAUTIONS

1. Do not enter the laboratory when an instructor/lab supervisor is not present, the lab door is closed, or a chain is across the entrance. Finish your lab work in time to clean up before the end of the scheduled lab period.

2. Use an approved disinfectant to clean your lab station at the beginning and end of each lab as directed by the instructor/lab supervisor.

3. Perform only authorized experiments. You must be enrolled in a class with a lab to perform lab work. Children, friends or visitors are not permitted to be with you while you do your lab work.

4. Wear personal protective equipment (PPE) when instructed to do so by your instructor/laboratory procedures or your lab supervisor. When required, the PPE should also be worn when cleaning up following an experiment.

5. Eating, drinking, mouth rinsing, applying cosmetics or lip balm or handling contact lenses is prohibited in the Science Center or group lab areas.

6. Shoes which offer reasonable protection will be worn while in the laboratory. Sandals are not acceptable footwear in the chemistry laboratory.

7. Be considerate of others working in the laboratory. Do not distract others while conducting experiments or accomplishing lab activities. When finished with equipment or materials to be shared with others, make them available to others as quickly as possible.

8. Clean all equipment, glassware and the work area you have been using and return them to their proper places in the laboratory before leaving the lab.

9. Know the location and proper use of safety equipment in the laboratory.

10. Immediately notify the lab supervisor of chemical spills, broken glass or other hazards. **Do not attempt to clean up such mishaps/materials by yourself without first alerting your instructor/lab supervisor.**

11. **Immediately notify the instructor/lab supervisor of any accidents, injuries, or situations in which exposure to human blood or other potentially infectious materials in the laboratory regardless of how minor they may appear to be.**

12. Apply Universal Precautions and Body-Substance Isolation infection control procedures when appropriate to minimize potential exposure to bloodborne pathogens.

13. You may be exposed to potentially hazardous materials in the process of completing your required laboratory activities. Persons with specific health concerns such as expectant mothers, wearers of contact lenses, persons with known hypersensitivities, etc. should consult their personal physician for advisement about potential risks before enrollment in the course.

14. **Before doing any laboratory work in group labs or in the Science Center, view the video on lab safety including bloodborne pathogen precautions and successfully complete the safety exam**.

15. In case of an emergency, think prior to aiding a fellow person in distress. Notify your instructor/lab supervisor first. If you then choose to assist an injured person, provide yourself with protection from blood or other potentially infectious materials. If possible exposure occurs, ask for a copy of the incident report and consult with your personal physician.

UNIT I – MATHEMATICS AND ANALYSIS

OBJECTIVE:

Apply the rules of mathematics, algebra, trigonometry, graphing, and scientific conventions to determine the values for physical quantities.

TEXT REFERENCES

All of Chapter 1, Section 3.2, and Appendix I

UNIT OBJECTIVES

1. Give the fundamental units for length, time, and mass in SI and British units.
2. Give the agreed prefix for power-of-10 multiples of SI units.
3. Use radian measure to find the lengths of arcs.
4. Convert from one unit to another unit for the same quantity when given necessary definitions.
5. Given two of three quantities (density, mass, and volume), determine the third quantity while maintaining the appropriate number of significant digits.
6. Construct a linear graph of paired data and write an equation for the graph.
7. Define a vector quantity and a scalar quantity and give an example of each.
8. Resolve a vector into its components.
9. Combine given components of a vector to find the total magnitude and direction.

UNIT II – KINEMATICS: STUDIES OF MOTION

OBJECTIVE:

Apply the rules of kinematics to determine the position, velocity and acceleration of an object moving in one or two dimensions.

TEXT REFERENCES

All of Chapters 2 and 3.

UNIT OBJECTIVES

1. Calculate the average speed when given distance and time data. Conversely, calculate the distance when given average speed and time data.
2. Calculate the instantaneous speed by finding the slope of a position versus time graph.
3. Calculate the average acceleration when given speed and time data. Calculate the speed when given average acceleration and time data.
4. Calculate the instantaneous acceleration by finding the slope of a speed versus time graph.
5. Use the equations of linear motion to solve problems with constant acceleration.
6. Use the equations of linear motion to solve problems with gravitational acceleration.
7. Use the rules of vector addition to find the sum of two velocities.
8. Use the range equations for a projectile to calculate any one of the unknowns when given values of the other variables.

UNIT III – FORCE AND ITS EFFECTS

OBJECTIVE:

Apply Newton's Three Laws of Motion to analyze the forces acting upon bodies in equilibrium and bodies that are undergoing translational acceleration.

TEXT REFERENCES

All of Chapter 4.

UNIT OBJECTIVES

1. Calculate the resultant of two or more forces acting on a mass.
2. Determine weight from mass and mass from weight at a point where the gravitational field intensity is known.
3. For two surfaces in contact, calculate the maximum static force of friction and the kinetic force of friction.
4. Apply Newton's Third Law to construct appropriate free-body diagrams for mass systems of simple geometry.
5. Apply Newton's Second Law to analyze the forces acting on a single body undergoing translational acceleration.
6. Apply Newton's Second Law to analyze the forces acting on a multi-body undergoing translational acceleration.
7. Apply Newton's First Law to analyze the forces acting on a system in static equilibrium.

UNIT IV – CONSERVATION LAWS

OBJECTIVE:

Apply the Laws of Conservation of Energy and Conservation of Linear Momentum to analyze the behavior of moving objects.

TEXT REFERENCES

Chapters 5 and 6.

UNIT OBJECTIVES

1. Calculate the work done by a force acting through a displacement.
2. Calculate the work done against
   a.) frictional forces in moving a mass
   b.) gravitational forces in lifting a mass
   c.) elastic forces in stretching or compressing a spring
1. List ten forms of energy and give an example of each.
2. State and apply the Law of Conservation of Energy to calculate the efficiency of an energy transfer device.
3. Apply the Law of Conservation of Energy to the solution of a translational mechanics problem
4. Determine the power required to accomplish a given task in a given amount of time.
5. Apply the Impulse-Momentum principle to determine the average force or change in velocity of a simple system.
6. State the Law of Conservation of Linear Momentum and describe the conditions for which the Law is valid.
7. Apply the Law of Conservation of Linear Momentum to the solution of explosion problems.
8. Apply the Law of Conservation of Linear Momentum to the solution of one-dimensional collision problems
9. Apply the Law of Conservation of Linear Momentum to the solution of a two-dimensional collision problem.

UNIT V – CIRCULAR AND ROTATIONAL MOTION

OBJECTIVE:

Apply the concepts of kinematics, dynamics, energy, and momentum to analyze the behavior of objects in circular and rotational motion.

TEXT REFERENCES

Chapters 7 and 8.

UNIT OBJECTIVES

1. Determine the linear speed of an object moving with uniform circular motion when given the angular velocity and/or perform the converse problem.

2. Calculate the centripetal acceleration of an object moving with uniform circular motion and determine the centripetal force necessary to keep an object moving in a circle with uniform speed.
3. Apply rotational kinematics equations to solve problems with constant angular acceleration.
4. Apply Newton's Law of Universal Gravitation to determine the force of attraction between two masses separated by a given distance.
5. Calculate the torque when given the lever arm and the force acting on the lever arm.
6. Apply the concept of torque to analyze the forces acting on a rigid body in equilibrium.
7. Apply the rotational form of Newton's Second Law to calculate the angular acceleration of a rotating body.
8. Apply the Law of Conservation of Energy to solve a rotational mechanics problem.
9. Apply the Law of Conservation of Angular Momentum to solve a rotational problem.

UNIT VI – PROPERTIES OF MATERIALS

OBJECTIVE:

Apply various rules governing the properties of materials to describe the behavior of solids, liquids, and gasses.

TEXT REFERENCES

Chapter 9 (Sections 1-3) and Chapter 10.

UNIT OBJECTIVES

1. Use Young's modulus to determine the extension of an elastically stressed solid.
2. Given two of the three variables (absolute pressure, gauge pressure, and atmospheric pressure), determine the third variable.
3. Determine the pressure in a fluid at specified depths.
4. Apply Pascal's Principle to determine the forces exerted by fluid systems.
5. Apply Archimedes' Principle to determine the buoyant force on a body wholly or partially submerged in a fluid.
6. Convert temperatures expressed in Celsius, Fahrenheit, or Kelvin into each other.
7. Calculate the linear or volumetric expansion of a material when subject to a change of temperature.
8. Apply the Ideal Gas Law to the solution of problems involving changes in volume, pressure, and temperature of gasses.
9. Use the Kinetic-Molecular Theory to describe the interplay between macroscopic and microscopic variables for gasses.

UNIT VII – THERMODYNAMICS

OBJECTIVE:

Apply the Laws of Thermodynamics to analyze the thermal behavior of various systems

TEXT REFERENCES

Chapters 11 and 12.

UNIT OBJECTIVES

1. Define the kilocalorie and calculate the amount of heat required to increase the temperature of a mass of water.
2. Define the Heat of Combustion, and apply it to problems involving production of heat.
3. Apply the method of mixtures to solve a calorimetry problem involving changes in temperature.
4. Apply the Law of Conservation of Energy to determine the change in temperature of a system when mechanical work is done.
5. Sketch a typical phase diagram, and determine the amount of heat energy required to increase the temperature of a substance when a change of phase is involved.
6. Explain by definition and example the three methods of heat transfer.
7. State the First and Second Laws of Thermodynamics.
8. Draw a schematic diagram of a heat engine or heat pump and calculate the Carnot efficiency or coefficient of performance for a given system.

UNIT VIII – WAVES AND SOUND

OBJECTIVE:

Apply principles of energy and wave behavior to describe and analyze sound related phenomena.

TEXT REFERENCES

Chapters 13 and 14.

UNIT OBJECTIVES

1. Define the terms period, frequency, wavelength, and amplitude.
2. Determine the period of a simple harmonic oscillator when given the physical parameters of the system.
3. Construct graphs of Displacement vs. Time for an oscillating system that is undamped, underdamped, critically damped, or overdamped.
4. Use the wave velocity equation ($v = \lambda f$) to determine the unknown variable when the other variables are given.
5. Describe by definition and example the difference between transverse and longitudinal waves.
6. State the perceptual variables that correspond to frequency, intensity, and harmonics. Give the frequency range for human hearing.
7. Convert a sound intensity from W/m^2 to decibels.
8. Use the Doppler effect to calculate the apparent change in frequency for a source moving toward or away from the observer.
9. State the Superposition Principle. Determine the harmonic wavelengths for standing waves on a string.
10. Define resonance. Determine the harmonic frequencies for resonance of air columns in pipes.