

COLLEGE PHYSICS (CP) COURSE SYLLABUS

INSTRUCTOR: Dr. Sandrine Colson-Inam

COURSE DESCRIPTION:

The College Preparatory Physics course is an introductory survey course for those students who are interested in studying the application-oriented aspects of physics. An analytical approach is used to study the applications of physics to everyday phenomena. The major units of study in this course include classical mechanics, wave motion, electricity, and (possibly) modern physics.

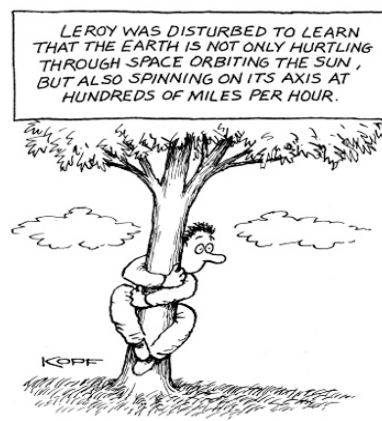
CLASS REQUIREMENTS:

- **Attendance and Punctuality.** If you are absent for any reason, you are responsible for any work you have missed. You must come to see your teacher during non-class time to pick up assignments and handouts that you missed. Your teacher will not remind you. This is your responsibility.
- Daily upkeep of a loose leaf **notebook/binder** to bring for each class (graded - random checks).
- Demonstrate **responsible and respectful** individual, partner and group **behavior**.
- **Be prepared** for class: completed homework, textbook, notebook, pencil .
- Daily **Homework** due and ready to be handed in at beginning of class. Homework is an integral part of this course and **NO LATE WORK WILL BE ACCEPTED** except with an excused absence, in which case the assignment is due the following day.
- Keep track of class and home work using the given annotated **course assignment outline** and by writing your assignments in your assignment notebook daily.
- **Labs:** although labs will be performed as group work and some data analysis will be done by the group, lab reports are an individual's work and will be graded accordingly.
- This is a science lab. Safety is a primary concern. **MUST follow all lab's rules** and use materials/tools appropriately – no injuring yourself, your fellow students, and especially the teacher! **SAFETY - SAFETY - SAFETY**
- **Class participation** and completion of daily class work. Students are expected to complete daily in-class assignments and to work through the period.
- Each quarter you will be evaluated based on **quiz and test scores, independent project(s) and homework**. All assignments are an individual's work and will be graded accordingly. Tests will emphasize in-class notes so students are expected to take and maintain well-organized notes during class.
- **Make up work:** Quiz and Test make-ups should be done in the science office on the following day. Lab make-ups must be coordinated with your teacher directly.
- For all **graded assignments**, complete work must be shown in order to receive complete credit.

Additional information will be given as class progresses.

GRADING: (subject to change!)

- **Class Participation** 10 %
- **Homework** 10 %
- **Quizzes** 15 %
- **Labs/Projects** 20 %
- **Tests** 45 %



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USEFUL INFO:

- Dr. Colson-Inam's web site: www.sci-teach.com & it's learning folder(class 1420-period)
- On-campus help: Several teachers are teaching this course so come at the Science office and check with one of the available teachers. If you need to meet with a specific teacher: make an appointment. Please don't wait until the day before a quiz or test to ask for help. If you have scheduled a time and cannot make it, please let us know as soon as possible.
- Textbook: *Physics – Principles and Problems* by Paul W. Zitzewitz, Glencoe Science
- Online content help:
 - Wayland High School Science web site
 - Physics:
 - http://glencoe.mcgraw-hill.com/sites/0078807220/student_view0/chapter1/ (Glencoe Book Student Help – chapter by chapter)
 - <http://www.glenbrook.k12.il.us/gbssci/phys/Class/BBoard.html> (The Physics Classroom)
 - <http://www.hippocampus.org> (Physics → Introductory Physics II)
 - <http://dev.physicslab.org/TOC.aspx> (The Physics Lab)
 - http://wps.aw.com/wps/media/access/Pearson_Default/2315/2370801/login.html (The Physics Place)
 - Math Questions:
 - <http://mathforum.org/dr.math/>
 - <http://www.motionnet.com/calculator/> (scientific calculator)
 - http://webgraphing.com/graphing_advanced.jsp (graphic calculator)
 - http://www.manuelsweb.com/in_cm.htm (converting units)
 - <http://nces.ed.gov/nceskids/createagraph/default.aspx> (create a graph)
 - Other:
 - <http://www.hippocampus.org/> (various online tutorials with examples: math, various sciences, etc.)
 - http://www.todayinsci.com/1/1_07.htm (science history)
 - <http://dictionary.reference.com/browse/aprine> (dictionary, thesaurus, encyclopedia)
 - <http://www.wordreference.com/> (language to language dictionary)
 - <http://www.writinghelp-central.com/> (writing help)



COLLEGE PHYSICS (CP) COURSE SYLLABUS

COURSE CONTENT:

The next few sections contain a syllabus for the course. We will do our best to stick to this syllabus, but if changes arise, we will provide you with updates.

Note: Homework assignments and other details will be listed online soon at www.sci-teach.com .

UNIT 1: Preliminaries & 1D Motion

Objectives/Topics

- Identify and use common metric prefixes
- State the fundamental SI units for time, length, and mass
- Demonstrate an ability to use scientific notation
- Show an understanding of significant digits, their use in measurement and in calculations
- Distinguish between independent and dependent variables
- Be able to graph data points
- Recognize quadratic and inverse relationship
- Interpret graphs of 'd vs, t' to find instantaneous and average velocities
- Interpret and draw graphs from motion descriptions
- Write and use equations describing the position of an object moving at constant velocity
- Interpret 'v vs, t' graphs in terms of instantaneous velocity and total displacement

UNIT 2: Acceleration and Forces

Objectives/Topics

- Define and use acceleration in motion problems
- Interpret 'v vs. t' graphs in terms of accelerations
- Write and use equations describing the position of an object moving at constant acceleration
- Solve Free Fall problems using 'g'
- Define and Explain Newton's Three Laws of Motion
- Define Inertia, Equilibrium, Tension, Normal forces, & Friction
- Draw free body diagrams
- Recognize the differences among mass, weight, apparent weight & weightlessness
- Understand the concept of drag and terminal velocity

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UNIT 3: Vectors and Forces in 2D

Objectives/Topics

- Describe vectors in terms of magnitude and direction
- Describe vectors in terms of components
- Add and subtract vectors graphically and by components
- Convert vectors back and forth between magnitude/direction and components
- Understand and apply the standard models for kinetic and static friction
- Draw and interpret force diagrams in 2D
- Solve force problems

UNIT 4: Projectile Motion & Circular Motion

Objectives/Topics

- Describe & Solve projectile motion problems
- Centripetal vs. Centrifugal Forces

UNIT 5: Planetary Motion & Gravity

Objectives/Topics

- Gravitational field and force
- Kepler's laws of motion
- Newton's law of universal gravitation
- Effect of gravity on Earth

UNIT 6: Linear Momentum

Objectives/Topics

- Impulse
- Momentum
- Impulse-Momentum Theorem
- Conservation of Momentum

UNIT 7: Work, Power & Energy

Objectives/Topics

- Work & Work-Energy Theorem
- Power
- Variable Forces & the area under the curve
- Kinetic Energy
- Potential Energy (Conservative forces)
- Conservation of Energy/ Mechanical Energy

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UNIT 8: Rotational Motion

Objectives/Topics

- Rotational Dynamics
- Torques
- Moment of Inertia
- Angular Momentum
- Rotational kinetic energy

UNIT 9: Electrostatics

Objectives/Topics

- Charge and Charge Transfer
- Electric forces (Coulomb's Law)
- Electric Fields
- Electric Potential Energy
- Electric Potential (Volts)

UNIT 10: Electricity & Electric Circuits

Objectives/Topics

- Capacitors
- Current
- Resistors, Resistance, Resistivity
- Circuit Symbols & Diagrams
- Switches and fuses
- Power
- Simple Parallel circuits
- Simple Series circuits
- Combo Circuits

UNIT 11: Waves

Objectives/Topics

- Key terms & Relationships: Amplitude, Frequency, Wavelength, period, wave speed, peaks, troughs
- Types of waves: Longitudinal, transverse
- Wave behavior: Reflect, refract, diffract, interfere, scatter, Doppler shift
- Sound as a wave
- Light as a wave