

PHYS 121: General Physics I: Mechanics SYLLABUS AND COURSE CALENDAR: 28 August 2017



Syllabus and Summary Information:

- Content:** **Calculus-based Introductory Newtonian Classical Mechanics:**
Kinematics, Velocity, Acceleration, Vector Motion, Cartesian Unit Vectors, Circular Motion, Centripetal Acceleration, Projectile Motion, Particle Dynamics, Newton's Laws of Motion, Free-Body Diagrams, Contact Forces, Tension, Pulleys, Friction, Spring Forces, Work, Path integrals, Kinetic energy, Energy & Momentum Conservation, Classical Work-Energy Theorem, Classical Impulse-Momentum Theorem, Systems, Center-of-Mass, Elastic & Inelastic Collisions, Rotational Motion, Conservation of Angular Momentum, Torque, Simple Harmonic Motion, Damped Oscillators, Harmonic Waves, Gyroscopes, Gravity, Relativity, some Astrophysics, some Cosmology
- Prerequisites:** Some calculus: One of these (concurrent) MATH 121 or MATH 125 *or* one year of high school calculus
- Schedule:** Lectures: M W F 11:40 to 12:30 PM in Strosacker Auditorium, Case Quad
Labs: every other week as scheduled. First Lab: Tuesday, Aug 29
- Instructor:** Corbin Covault, Rockefeller 207 (2nd floor)
Phone: 216-368-4006 (office) or 216-339-3861 (mobile)
E-mail: corbin.covault@case.edu
- Office Hours:** Typically: Mon 1PM-4PM, Thu 1PM-4PM, Fri 2PM-4PM, Rock 207
- Course Assistant:** Ryan Lorek, Office: A.W. Smith Room 11, E-mail: ryan.lorek@case.edu
- SI Leaders:** Jack Worsham (wjw49@case.edu) and
Vinicius Okada da Silva (vx022@case.edu)

Syllabus and Summary Information Continued:

Course Web Page: <http://www.phys.cwru.edu/courses/p121>

Lab Web Page: <http://physicslabs.phys.cwru.edu/MECH/121>

Phorum Board: <http://www.phys.cwru.edu/forums/list.php?99>

Online Text: *Physics 121 Online Notes* by Bob Brown

Recommended Texts: *Physics for Engineers & Scientists, VI, 3Ed.* by Ohanian & Markert ISBN: 978-0393930030
The Cartoon Guide to Physics by Gonick and Huffman ISBN: 978-0062731005

Very Recommended: *i>Clicker+ student remote* ISBN: 978-1464120152

Required for Online Homework: *The Expert TA*, software license: Class Code: **USW37OH-F6B871-1M5** register at: <https://login.theexpertta.com/registration/>

Required for Lab: *Intro Mechanics Lab Manual* and a Lab Notebook (available in bookstore)

Homework: Worth **15%** of your grade, assigned weekly as follows:

2% = Pre-Lecture Homework usually due Wednesdays, 11 AM via **Blackboard**.

3% = Online Homework usually due Fridays, 11 PM via **The Expert TA**.

10% = Written Homework usually due Mondays, 5 PM **outside Rock 207**.

Written Homework solutions by instructor, will be posted online.

Eleven weekly homework assignments, lowest score will be dropped.

No late homework will be accepted under any circumstances.

Grade Breakdown:	Homework	15% (11 homeworks, lowest score is dropped)
	1st hour exam (Fri Sep 22)	5%
	2nd hour exam (Fri Oct 20)	10%
	3rd hour exam (Fri Nov 17)	10%
	Laboratory	25%
	Final exam (Mon Dec 18, 3:30PM)	35%

Bonus Points: *Entirely Optional:* Up to 5% extra points for clicker participation

PHYS 121 Fall 2017 Course Schedule:

Here is an *approximate* schedule for the course (subject to modification in the weekly reading and homework assignment). For this table, I count fifteen weeks in the class and label each week by the date of the Monday on that week. Note that all Hour Exams will be held on Fridays. **Important: the dates indicated for the Hour Exams and the Final Exam are fixed.** Also dates where no class will be held are so indicated:

	Monday	Assigned Reading from	
	Wk	Date	Online Notes: Important Dates
Cycle 1	1	Aug 28	Ch 00 to Ch 04
	2	Sep 04	Ch 05 to Ch 08
	3	Sep 11	Ch 09 to Ch 12
	4	Sep 18	Ch 13 to Ch 15
Cycle 2	5	Sep 25	Ch 01+ to Ch 04+
	6	Oct 02	Ch 05+ to Ch 08+
	7	Oct 09	Ch 09+ to Ch 12+:
	8	Oct 16	Ch 13+ to Ch 15+
Cycle 3	9	Oct 23	Ch 01++ to Ch 04++
	10	Oct 30	Ch 05++ to Ch 07++
	11	Nov 10	Ch 08++ to Ch 10++
	12	Nov 13	Ch 10++ to Ch 13++
Cycle 4	13	Nov 20	Ch 14++ to Ch 15++
	14	Nov 27	Gravity & Relativity
	15	Dec 04	Astrophysics & Cosmology
		Dec 11	Reading Days, Dec 11, 15
		Dec 18	Final Exam
			3:30 to 6:30 PM, Mon Dec 18

PHYS 121: Anticipated Typical Weekly Workload:

At CWRU the “rule of thumb” is that a four credit hour course should correspond to a total average weekly time commitment of about 12 to 16 hours per week. Here’s how this breaks down for Physics 121:

Hours per Week	Weekly PHYS 121 Activities:
3	In-class lecture hours
1	Pre-lecture Readings and Video Clip Homework
1	Online Homework
4	Written Homework
3	Labs: (<i>either</i> in-lab <i>or</i> prep and lab reports)
(4)	Optional: additional practice, study, office hours, SI sessions)
12 to 16	Total Average Hours per week workload

PHYS 121: Goals and Philosophy of the Course:

The main goals for for Physics 121 General Physics I: Mechanics are:

- To have students **understand** the formal method of investigating the world through the physical sciences, and in particular, to have students learn for themselves how physics as a discipline can be used to obtain a deep understanding of how the world really works and how that knowledge can be used to make predictions and solve problems.
- To have students **understand** the calculus-based mathematical formalism for describing the motion of bodies (called kinematics) and also to **understand** the major scientific paradigm called **Newton Laws** which explains the causes of motion (called dynamics) in terms of forces.
- To have students **understand** the major reformulation of Newton’s Laws, known as the **Conservation Laws** (energy and momentum) which can provide powerful ways for explaining essential physical phenomena.
- To have the students **understand** a select set of modern physics topics as a window into “thinking like a physicist” which provides a powerful general approach for tackling a wide range of technical problems in almost any field of endeavor.
- To have students **demonstrate** their mastery of all of the above listed understandings by successfully **applying** physics concepts toward **solving a broad range of problems** – including conceptual and technical problems, both familiar and unfamiliar – with clarity, precision, logical coherence, and mathematical sophistication.
- To have student **explain** their own problem-solving work correctly, clearly, and completely, further demonstrating the breadth and depth of their understanding.