

# Physics 130 (General Physics I)

## COURSE AND INSTRUCTOR INFORMATION

**Course:** PHY 130 (General Physics I)

**Lecture Location:** Merion 109 (**Section: 04**)

Merion 112 (**Section: 03**)

**Lecture Time:** MWF: 12:00 – 12:50 pm (**Section: 04**)

MWF: 2:00 pm – 2:50 pm (**Section: 03**)

**Instructor:** Anil K. Kandalam (Dr. Kandalam or Dr. K)

**Office Location:** Schmucker Science South, SSS 403A

**Office Telephone:** (610) 738 0596

**Email:** akandalam@wcupa.edu

**Office Hours:** MWF: 10:00 am – 11:00 am; Tuesday: 1:00 pm – 3:00 pm; or by appointment

## COURSE DESCRIPTION

PHY130 is the first semester introductory physics course. Topics covered include kinematics (the description of motion), dynamics (how forces affect the motion) of an object, heat and temperature (consequences of molecular motions), thermodynamics, oscillations, and waves. This course, along with the PHY 140, provides an introduction to the fundamental concepts in understanding the physical world.

**A good grasp on high-school algebra and trigonometry is pre-requisite for this course.** We will be using algebra and trigonometry. If you feel that your skills are weak in either of these two areas, please feel free to see me during office hours or by appointment. I am willing to work with you and help you catch up.

## EXPECTATIONS

This is a fast pace course. For a successful completion of this course, you are not only expected to come to the class regularly, but also take notes in the class regularly, solve the problems assigned in the class, and read the example problems from the text book. **In order to keep up with the pace of the course, I strongly suggest you to read the sections in the text indicated in the schedule before you get to class.**

## REQUIRED COURSE MATERIALS

**Textbook:** Physics, by Cutnell and Johnson, 9<sup>th</sup> edition\*

**Other Required Materials:** The Wiley-Plus access code for the text book\*

Laboratory Notebook (see lab syllabus for details)

Physics 130 lab manual (will be posted on D2L)

*\*An online copy of the textbook is available with the Wiley-Plus code.*

## SPECIFIC COURSE OBJECTIVES

Our goals are to explore, analyze, and investigate the world around us to gain a better understanding of how and why various physical phenomena occur. In this course, we aim to develop a fundamental understanding of principles of kinematics, work, energy, rotational dynamics, collisions, thermodynamics, and fluids. We will also aim to apply these concepts in solving problems to gain both qualitative perspective and quantitative understanding of various physical phenomena.

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## UNIVERSITY GENERAL EDUCATION GOALS

This course strives to have students meet the following general education goals:

1. Ability to communicate effectively
2. Ability to employ quantitative concepts and mathematical methods
3. Ability to think critically and analytically

## D2L

This course has a D2L page. I will post lecture slides, important conceptual and numerical multiple choice questions etc. to D2L. Check it regularly.

## GRADING

The final grade assessment for this course will be based on the following:

- Lab.....15%
- Homework .....20%
- Exams (3 @ 15% each).....45%
- Final exam.....20%

Letter grades will be assigned on the following scale. However, I reserve the right to adjust the weights of individual components, or the scale to account for unforeseen circumstances.

93 – 100 %	A	73 – 76 %	C
90 – 92 %	A–	70 – 72 %	C–
87 – 89 %	B+	67 – 69 %	D+
83 – 86 %	B	63 – 66 %	D
80 – 82 %	B–	60 – 62%	D–
77 – 79 %	C+	59% or lower	F

## LAB

This course has a laboratory component. Your lab grade will be factored into your final grade for this course. Please see the lab syllabus for more details.

## HOMEWORK

This course will utilize an online homework system via **Wiley-Plus**. Homework will be assigned every week and each assignment will have 10 – 15 problems. Typically, the assignments are due by **10:00 PM (EST) on Wednesday**. **No late submissions are allowed**. I reserve the right to modify homework frequency and due-dates to reflect unforeseen circumstances. **I will not drop any homework grades**.

Please remember that you are responsible for completing homework assignments in a timely manner and informing me of problems, if any, in accessing the homework. Failure to complete an assignment because you could not access the homework an hour before it is due is not an excuse. It cannot be overemphasized the importance of spending time on these assignments. I encourage you to discuss the homework problems together, and to work and learn together. But, any assignment you turn in for grade must be your OWN work. It is in your best interest to learn how to do the problems yourself since most of the questions on the exams are based on the homework assignments.

*The assigned homework is the minimum amount of practice a highly gifted student would need. I highly suggest doing more, as many as possible, practice problems. Please note the textbook has answers for all of the odd problems.*

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### **EXAMS**

Four in-class exams (closed book) will be given during the course of the semester. Each of these exams will consist of a combination of multiple choice questions (conceptual and numerical) and open-ended numerical problems for which the students are expected to show all the work (math steps). **I will drop the lowest exam grade.**

**If you miss an exam:** If you miss an exam, you will receive a ZERO on that exam. The policy of dropping an exam score is meant to alleviate the need for make-up exam. This means every student has one in-class exam that they can for whatever reason, sickness, family emergency, etc., not be counted. **Therefore, I will not give a make-up exam.** The exceptions, however, are limited to the absences related to University Sanctioned Events (see below). If you miss an exam for a University Sanctioned Event you must notify me in advance so that we can arrange for you to take the exam in a manner consistent with its integrity. You must also provide some form of documentation (performing arts program, competition schedule etc.

### **FINAL EXAM**

The final exam (closed book) will include all topics covered (cumulative) in the course and is mandatory. Final exam will consist of mostly multiple choice questions (conceptual and numerical) and few open-ended questions. Missing the final exam will result in a zero for the exam unless EXTREME circumstances apply. Even in that case, extra questions will be added to the make-up final. You must bring your university ID to the final exam.

### **ATTENDANCE POLICY**

A regular attendance to the lectures is an important part of this course and I highly recommend it. This is your chance to ask questions, see examples and get help in solving problems. I am here to guide you through the material. Attendance will benefit your understanding and therefore grade. However, I do not give an attendance grade. Students must understand that they are responsible for all material covered and assigned during their absences (excused and unexcused) and that they are responsible for the academic consequences of their absences. The lab component of this course, however, has a different attendance policy. **Please see lab syllabus for lab attendance policy.**

### **ELECTRONIC DEVICES POLICY**

In order to create a conducive learning environment, please arrange for all electronic devices to be set in silent/vibrate mode and put away. If you need to use a device to accommodate a disability, please see below. If I see anyone **texting or using their cell phones** during the class, I will take 5 points off of the nearest exam grade, and you will be considered “absent” for that day, since you are obviously not mentally present.

### **DISABILITY STATEMENT**

If you have a disability which will require special accommodation, please meet with me as soon as possible to discuss your needs. The decision as to accommodations required will be done by the Office of Students with Disabilities. If you have not contacted them already, you should do so immediately at (610) 436-2564. Both the WCU and I desire to comply with the ADA of 1990 and the published university guidelines.

### **ACADEMIC INTEGRITY & CONDUCT**

I have a zero tolerance policy for breaches of academic integrity. Breaches of academic integrity will be investigated and sanctions imposed to the full extent available under University policy. For questions regarding the university Academic Dishonesty, the No-Grade Policy, Sexual Harassment, or the Student Code of Conduct, students are encouraged to refer to their major department’s handbook, the

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Undergraduate Course Catalogue, the Rams Eye View, or the University Web Site. Please understand that improper conduct in any of these areas will not be tolerated and may result in immediate ejection from the class.

### **UNIVERSITY SANCTIONED EVENTS**

If you are participating in a University sanctioned event during one of our scheduled exams you must notify me in advance. You must provide some form of documentation. We can then arrange for you to take the exam in a manner consistent with exam integrity. For details please see the discussion of University Sanctioned Events in the WCU undergraduate catalog.

### **PHYSICS TUTORING**

The Learning Assistance & Resource Center (LARC), (610) 436-2535, offers physics tutoring. I also strongly encourage you to utilize my office hours.

### **INTELLECTUAL PROPERTY STATEMENT**

The instructor utilizes copyrighted materials under the “Freedom and Innovation Revitalizing United States Entrepreneurship Act of 2007” (Fair Use Act). Apart from such copyright protected materials, all other intellectual property associated with this course is owned and copyrighted by the instructor, including, but not limited to, lectures, course discussions, course notes and supplementary materials posted or provided or provided to students authored by the instructor, assessment instruments such as exams, and presentation slides. No recording, copying, storage in a retrieval system, or dissemination in any form by any means of the intellectual property of the instructor, in whole or in part, is permitted without prior written permission of the instructor. When such permission is granted, it must specify the utilization of the intellectual property and all such permissions and waivers shall terminate on the last day of the finals in the semester in which this course is held.

Links and references to on-line resources provided by the instructor may lead to other sites. The instructor does not sponsor, endorse or otherwise approve of any information appearing in those sites, nor is responsible in any way for the content of those sites. The instructor makes no warranty or responsibility for the copyright status of such material. However, should problems with copyright status be brought to the attention of the instructor, reference to offending materials will be removed.

### **PUBLIC SAFETY**

The Emergency Communications Committee recommends that the number of WCU’s Department of public safety be available on every course syllabi. **WCU Department of Public Safety: (610) 436-3311.**

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**COURSE SCHEDULE:** This schedule is tentative. I will try to follow it as closely as possible

Date		Lecture	Reading	Laboratory
M	Aug. 26	Introduction, Units, and Trigonometry	1.2, 1.4	NO LAB
W	Aug. 28	Scalars & Vectors; Vector Addition	1.5, 1.6	
F	Aug. 30	Vector Subtraction; Components of a Vector	1.6 – 1.8	
M	Sept. 2	No Class – Labor Day		Introduction
W	Sept. 4	Motion in 1-D: Displacement, Speed & Velocity	2.1 – 2.3	
F	Sept. 6	Motion in 1-D: Acceleration, Equations of Kinematics	2.3 – 2.5	
M	Sept. 9	Equations of Kinematics & Free Fall	2.5 – 2.6	Using Data Studio
W	Sept. 11	Graphical Analysis and Lots of Problems	2.7	
F	Sept. 13	EXAM 1: Chapters 1 & 2		
M	Sept. 16	Kinematics in 2-Dimensions	3.1, 3.2	Free Fall
W	Sept. 18	Motion in 2-D: Projectile Motion	3.3	
F	Sept. 20	Force and Mass, Newton’s Laws of Motion (I & II)	4.1 – 4.4	
M	Sept. 23	Newton’s III Law, Gravitational Force	4.5 – 4.7	NO LAB
W	Sept. 25	The Normal Force, Static Friction	4.8 – 4.9	
F	Sept. 27	Kinetic Friction, Tension Force, and Equilibrium	4.9 – 4.10	
M	Sept. 30	Equilibrium Applications of Newton’s Laws	4.11	Projectile Motion
W	Oct. 2	Non-equilibrium and Lots of Problems	4.12	
F	Oct. 4	EXAM 2: Chapters 3 & 4		
M	Oct. 7	FALL BREAK		Coefficient of Friction
W	Oct. 9	Uniform Circular Motion: Part I	5.1 – 5.3	
F	Oct. 11	Uniform Circular Motion: Banked Curves & Satellites	5.4 – 5.6	
M	Oct. 14	Work and Kinetic Energy	6.1 – 6.2	Comparing measured Values
W	Oct. 16	Gravitational Potential Energy and Conservation	6.3 – 6.5	
F	Oct. 18	Non-Conservative Forces and Power	6.6 – 6.7	
M	Oct. 21	Impulse and Momentum	7.1 – 7.2	Work-Energy theorem
W	Oct. 23	Collisions in 1 – Dimension & Center of Mass	7.3, 7.5	
F	Oct. 25	Rotational Motion and Angular Displacement	8.1 – 8.3	
M	Oct. 28	EXAM 3: Chapters 5 – 7		Air-Cart Collisions
W	Oct. 30	Centripetal and Tangential Acceleration	8.4 – 8.6	
F	Nov. 1	Torque and Equilibrium	9.1 – 9.2	
M	Nov. 4	Center of Gravity and Newton’s III law for rotation	9.3 – 9.4	Biomechanics
W	Nov. 6	Rotational Kinetic Energy and Angular Momentum	9.5 – 9.6	
F	Nov. 8	Simple Harmonic Motion, Pendulum	10.1 – 10.4	
M	Nov. 11	Resonance, Deformation, Hooke’s Law	10.6 – 10.8	Elasticity
W	Nov. 13	Fluids: Pressure and Pascal’s Principle	11.1 – 11.5	
F	Nov. 15	Fluids: Archimedes’ Principle and Continuity	11.6 – 11.8	
M	Nov. 18	Fluids: Bernoulli’s Principle and Viscosity	11.9 – 11.11	Archimedes’ Principle
W	Nov. 20	Waves and Sound: Waves on a String	16.1 – 16.3	
F	Nov. 22	Sound: Speed of Sound, Intensity, and the Doppler Effect	16.5 – 16.9	
M	Nov. 25	Superposition, Standing Waves and Resonance	17.1, 17.5, 17.6	NO LAB
W	Nov. 27	THANKSGIVING BREAK		
F	Nov. 29			
M	Dec. 2	EXAM 4: Chapters 8 – 11 & 16		NO LAB
W	Dec. 4	Temperature and Heat	12.1 – 12.2, 12.4 – 12.7	
F	Dec. 6	Kinetic Theory	14.1 – 14.3	
M	Dec. 9	The laws of Thermodynamics	15.1 – 15.3, 15.7 – 15.9	NO LAB