Wheeling Jesuit University
Department of Physics
PHYS 151-01 Physics I 4 credit hours Spring 2019

Instructor: Dr. Peter Ehni
Office: D-111B x-2433 pehni@wju.edu
Office hours: 12-1 M,W,F; and by appointment any time; if my door is open I probably have time to help you. I will have a lot of free time on Tuesdays and Thursdays and should have time to help you then.

Text: University Physics Volume 1 by OpenStax. This is a free digital book. Simply go to the OpenStax website and you can download it or view it on the web ; http://openstaxcollege.org. You can also purchase a paperback copy for around $50 on Amazon. Homework is assigned and graded using Expert TA which must be purchased online from Expert TA, $62.50 per semester (more about this in the homework section) .

Class Time and Place: Donahue 129, MWF 1:00am-1:50am T 12:00pm-12:50pm

Catalog Course Description:
A calculus-based introduction to the concepts and methods of physics; 1:Kinematics, Newtonian Mechanics, relativity, conservation laws, harmonic motion, fluids and elasticity. Mat 111 is a co-requisite.

Goals and objectives:

Our goals are to build a conceptual understanding of physics, increase our problem solving skills and develop our critical thinking abilities. We will study: Newtonian Mechanics (Ch. 1 – 12), Fluid Mechanics (Ch. 14), Waves and Acoustics (Ch. 15-17). Calculus will be used as needed. Mathematically, you should be very comfortable using algebra and trigonometry.

Student Learning Outcomes:
Upon completing physics I, you should:

0. Be able to solve multi-step physics problems (M)
1. understand the general mathematical description of motion (M)
2. understand units and dimensional analysis at a useful level (M)
3. know, understand, and apply the concepts of scalars and vectors (M)
4. know Newton's "so-called" 3 laws of motion (L)
5. know the fundamental conservation principles (including energy, momentum, and angular momentum) (L)
6. Newton's 1st law
(a) know the concept of an inertial reference frame (L)

(b) know that forces cause changes in state of motion (M)
7. Newton's 2nd law
(a) know quantitatively how forces cause accelerations (i.e. apply F=ma for rectilinear and uniform circular motion) (M)
(b) be able to identify common forces and produce free-body diagrams (M)
(c) be able to solve the equations that result from analysis of a free-body diagram (M)
(d) apply Newton's laws to extended systems using the ideas of torque and moment-of-inertia (M)
8. Newton's 3rd law
(a) understand the common misconceptions about this “law" and how to avoid them (L)
(b) apply the 'law' in problem solving (L)
(c) understand the relationship between the 3rd law and the conservation of momentum (L)
9. Rotational Dynamics
(a) rotational kinematics (M)
(b) Moment of Inertia (M)
(c) angular momentum (L)
(d) Torque (be able to identify both the moment arm and line of action) (M)
10. Energy Conservation
(a) know the definition of work and how it can be operationally used to de_ne energy (L)
(b) distinguish between 'conservative' and non-conservative forces, and understand the origin of a 'potential' energy function (especially for springs and gravity) (L)
(c) know and apply the work-kinetic energy theorem (M)
(d) apply energy conservation (M)
11. Momentum Conservation
(a) understand and apply the idea of a center of mass and a center of mass frame (L)
(b) distinguish between various types of collisions/interactions (e.g. elastic/inelastic or explosive) (L)
(c) solve momentum conservation problems in 1 and 2 dimensions (M)
12. Angular Momentum Conservation
(a) know how to apply and use Angular momentum conservation for rotations about a single axis (L)
(b) identify 'when' angular momentum should be conserved (L)
13. Harmonic Motion
(a) distinguish the terms 'harmonic' motion and 'simple harmonic' motion (L)
(b) know/understand/apply terms such as amplitude, frequency, angular frequency, phase, and period (M)
(c) be able to graph and understand plots of harmonic motion (L)
(d) solve initial value problems for simple harmonic motion (L)

14. understand the application of mechanics in the context of fluids
(a) compressible vs. incompressiblefluids (L)
(b) Archimedes' principle (L)
(c) pressure as a function of depth (L)
(d) Pascal's principle (L)
(e) Bernoulli's principle (L)

Evaluation Methods:

There will be 5 equally weighted exams:

January 29
February 19
March 19
April 9
Final exam period – Monday April 29th at 2:00pm. The final will cover topics discussed after April 9th. Physics by its very nature is comprehensive and so shall be the final.
Each exam counts 20 pts. towards your final grade.
There will be no make-up exams!!

The only way to learn Physics is to do Physics. Homework will be assigned almost every class using the Expert TA website. Register and purchase at ExpertTA.com
PHYS 151 (Spring 2019) Student Registration Link:
http://goeta.link/USX50WV-6E02E4-1QY
Homework will be graded and scored automatically by the website. Homework will be worth 20 pts. toward your final grade.
Through ExpertTA you will be assigned a number of physics videos. These videos, when assigned, must be watched before class. They are pre-lecture videos. Points for watching the videos and completing the accompanying assignments will be included in the homework grade. Completing 90% of the pre-lecture videos will earn you a 5 point bonus.
We will do a number of in class learning activities called 'Interactive Lecture Demonstrations'. By simply participating to the best of your abilities as witnessed by you turning in a completed prediction sheet at the end of class you will receive full credit. If you choose to not turn in a completed prediction sheet or are absent that day you will receive no credit. Points from these activities will be included in the homework grade. If quizzes are given they will be figured in the homework grade.

Student Progress

Out of the 120 pts. offered you must score 93 pts. and above for an A, 90-92 pts. for an A^-, 87-89 pts. for a B^+, 83-86 pts. for a B, 80-82 pts. for a B^-, 77-79 pts. for a C^+, 73-76 pts. for a C, 70-72 pts. for a C^-, 67-69 pts. for a D^+, 60-66 pts. for a D. Below 60 pts. is an F. Your tests will be graded and returned. You can check

your homework score on Expert TA at any time.

Attendance Policy:
-The official school policy for attendance will be in effect: 8 cuts total for the semester.

Last Date to Drop the Course:
March 26, 2019

Disability Statement:
Wheeling Jesuit University offers students with documented disabilities individual accommodations on a case-by case basis with confidentiality in compliance with the American with Disabilities Act and Section 504 of the rehabilitation Act of 1973.
Ultimately, all students are responsible for their own academic achievement. They must attend classes, complete course assignments, and fulfill all university requirements for their chosen field of study. It is up to students with disabilities to seek out available assistance on campus and to utilize individualized accommodations.
In order to receive accommodations under Section 504 and ADA, students with disabilities must self-identify to the university, provide current (within three years) and comprehensive documentation concerning the nature and extent of the disability, and communicate their needs to the Disability Services Director located in Ignatius Hall Room G24 or call 304-243-4484 before each semester begins.

Academic Integrity Statement:
Students are advised that WJU's Academic Integrity Policy will strictly be enforced in this course (see https://www.wju.edu/studentlife/pdf/studenthandbook.pdf). Questions regarding the policy may be directed to the Office of the Academic Vice-President.
Cheating, during any event for which grades are assigned, will warrant immediate separation from the course and a grade of F will be recorded for the course. If I see your cell phone anywhere near you during a test, whether it is turned on or not, I must assume you are cheating (see above sentence on cheating).

Cell phones should be turned off during class. If you just can't make it through class without texting then please leave class to get your fix and consider seeing the school counselor for help with your addiction.

Official E-mail:
An official WJU e-mail is established for each registered student, each faculty

member, and each staff member. All university communications sent via e-mail will be sent to this WJU e-mail address.

Academic Resource Center:

The Academic Resource Center (ARC) is a totally free academic-support service available to all enrolled Wheeling Jesuit University students and staffed almost exclusively by WJU students recommended for employment by WJU faculty. The ARC is located in Bishop Hodges Library and is open five days a week:

Sundays 6:00-8:00 p.m.
Mondays-Thursdays 1:00-9:00 p.m.

Please visit the ARC's website (readily accessible on the Cardinal homepage under "Quick Links" or as the first listing under "Student Services") to learn about the ARC's services (emphasizing writing, math, and the sciences) and to schedule appointments.

Title IX Statement:

Wheeling Jesuit University seeks to provide an environment that is free of bias, discrimination, and harassment. If you have been the victim of sexual harassment, misconduct, or assault we encourage you to report this. If you report this to a faculty member, she or he must notify our college's Title IX coordinator about the basic facts of the incident (you may choose whether you or anyone involved is identified by name). For more information about your options at WJU, please go to http://wju.edu/titleix/.