New York City College of Technology
The City University of New York

Physics Department

PHYS 1433 – General Physics I: Algebra Based

Professor: Darya Krym
Email: daryakrym@gmail.com

COURSE DESCRIPTION

This is the first semester of an introductory one-year college level algebra-based physics course, which covers basic principles of mechanics. We cover kinematics (the description of observed motion), dynamics (the description of the causes of motion i.e. forces), energy and momentum (an alternative description of dynamics in terms of conserved quantities), thermodynamics (temperature, heat transfer), fluids, and waves. We learn to solve simple quantitative problems that illustrate these physical principles. We discuss how this framework explains some of the phenomena we observe in everyday life and in nature. The laboratory serves to demonstrate the principles learned in lecture and to train the student in collecting and recording data, calculating and analyzing results, and writing a scientific report.

NUMBERS OF HOURS AND CREDITS

4 Credits total: 2 hours laboratory each week + 4 hours of lecture

GRADE BREAKDOWN

Laboratory Grade 25% + Lecture grade 75% = total grade

There are three exams: two midterms and a final.
The three exams are weighed equally so the lecture grade is an average of the three exams.

Details of the laboratory portion of the class are discussed in the laboratory class.
Note that you must pass both lecture and lab separately, in order to pass the course as a whole

TEXTBOOK

https://openstax.org/details/books/college-physics

OTHER RESOURCES

an online encyclopedia and calculation tool: **https://www.wolframalpha.com/**
A collection of physics simulations: http://www.walter-fendt.de/html5/phen/ (I will point some specific ones out during the semester)

Homework: It is strongly advised that you go over all the homework problems, since this is essential to doing well on the exams, which will be based on the homework.

Lecture

Week	Topics	Chapter	Homework Assignment (suggested)
1	Measurements, Unit Conversions	1	Ch.1: word problems: 1, 12, 17, 29 Conceptual questions: 1-9,11
2	Motion Along a Straight Line	2	Ch.2: word problems: 3, 10, 18, 23, 44, 46, 60, 61 Conceptual questions: 3,13-17, 20-30
3	Vectors	3	Ch.3: word problems: 5, 10, 14, 17, 24 Conceptual questions: 9-12
4	Motion in a plane and **EXAM 1**	3	Ch.3: word problems: 29,31, 49, 57, 63, 68, 69, 70 Conceptual questions:13-21
5	Newton's Laws.	4	Ch.4: word problems: 9, 13, 18, 20, 22, 31,41, 42 Conceptual questions: 5, 6, 9, 15
6	Applications of Newton's Laws	5	Ch.5: word problems: 13, 17, 19, 22, 24, 36, 38
7	Circular Motion and Gravitation	6	Ch.6: word problems: 4, 8, 9, 15, 22, 31, 33, 35, 43, 44 Conceptual questions: 1,2 , 7, 10, 15
8	Work, Energy and Power	7	Ch.7: word problems: 6, 12, 16, 24, 25, 32, 34, 43, 55, 66
9	Momentum and Collisions	8	Ch.8: word problems: 3, 8, 14, 27, 28, 35, 49
10	Statics and Torque and **EXAM 2**	9	Ch. 9: word problems: 2, 7, 17, 28, 32, 33, 35
11	Fluid Mechanics	11 &12	Ch. 11: conceptual questions: 8, word problems:10, 15, 36, 45 Ch12: conceptual questions: 4, 5, 12 word problems: 21, 22
12	Temperature, Gas Laws	13	Ch 13: conceptual questions: 2, 6, word problems: 8, 10, 25, 33
13	Heat and Heat Transfer	14	Ch. 14: conceptual questions: 17, 24, 25 word problems: 8, 13
14	Waves	16	Ch.16: conceptual questions:14, 15 word problems: 53, 55, 56
15	Review and **Final Exam**		

The exam dates are approximate. The exam dates will be announced at least 2 weeks in advance.

Laboratory: This course comprises computer-based experiments in physics and traditional experiments. Although the laboratory activities are performed in groups, each student must write and submit his own individual laboratory report. The report consists of a title page, data sheet, computations, graphs, discussions and questions and will be graded on a scale of 100 points. By performing the experiment, collecting the data in the tables, and getting them signed by your instructor, you will get the first 60 points. The laboratory report, which is due at the beginning of the following laboratory session, will be then graded from 60 to 100. If handed in afterwards, the grade will be penalized of 10 points per week. During the semester, we will perform 13 experiments. The laboratory grade is based on the average of your 12 best laboratory reports grades and laboratory final exam. This laboratory grade will constitute 25% of the final grade for PHYS 1433.

TEXTBOOK for Laboratory:
Laboratory Experiments in College Physics, Roman Kezerashvili, Gurami Publishing.

Laboratory:

1	Introduction to Excel and Data Analysis
2	Measurements and Graphical Analysis
3	Simple Pendulum
4	Addition of Vectors
5	Linear Uniformly Accelerated Motion
6	Acceleration Due to Gravity
7	Projectile Motion
8	Hooke's Law and Spring Constant
9	Rotational Equilibrium and Center of Gravity
10	Conservation of Mechanical Energy
11	Conservation of Linear Momentum
12	Ballistic Pendulum
13	Measurement of the Specific Heat of Metals
14	Boyle's Law
15	Laboratory Exam