The City College of New York
Department of Physics
Fall 2022
Physics 20700 - Sections ST, ST2

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Required text: Halliday, Resnick and Walker, "Fundamentals of Physics, 11th Edition"
Office hours: Tuesday and Thursday from 2-4 PM in MR423B (or by appointment)
Class schedule: Tu, Th 5:00 - 6:40 PM in MR-4

Course Outline (tentative)

Text Chapter &Topic	Reading Ch. (Sec.)	*Recommended* problems (NOT homework problems)
Ch. 1 Measurement	1(1-3)	1(P1,9,12,23,47)
Ch. 2 Motion Along a Straight Line	2(1-6)	2(Q1, P1,3,15,25,57,73,91)
Ch. 3 Vectors	3(1-3)	3(Q6, P5,7,14,23,32,39,57)
Ch. 4 Motion in Two and Three Dimensions	4(1-7)	4(Q7, P8,17,23,29,33,56,58,62,67,74,80,90)
Ch. 5 Force and Motion	5(1-3)	5(Q9, P1,4,6,13,17,28,41,51,57,77,79,81,87)
Ch. 6 Friction, Uniform Circular Motion	6(1-3)	6(Q8, P11,16,31,47,48,53,57,59,63)
Exam #1		
Ch. 7 Kinetic Energy and Work	7(1-6)	7(Q10, P1,4,10,13,15,17,21,26,31,35,46,63)
Ch. 8 Potential Energy, Conservation of Energy	8(1-5)	8(Q1, P6,9,16,31,42,45,55,58,69,75,85)
Ch. 9 Linear Momentum	9(1-9)	9(P4,13,25,28,40,45,48,61,65,75,102)
Ch. 10 Rotational Motion	10(1-8)	10(Q5, P2,11,13,25,30,39,45,47,51,56,63,71,91)
Ch. 11 Torque, Angular Momentum	11(1-9)	11(Q11, P25,29,33,39,45,55,58,85)
Exam #2		
Ch. 12 Equilibrium, Elasticity	12(1-3)	12(Q5, P9,21,24,35,60,68,73)
Ch. 13 Gravitation	13(1-7)	13(Q9, P4,6,19,31,39,41,47,50,57,63,88,90)
Ch. 14 Fluids	14(1-7)	14(Q2,7, P5,26,27,41,57,61,64,69,77,79,90)
Ch. 15 Oscillations	15(1-6)	15(Q5,7, P1,9,13,17,26,31,33,71,91)
Ch. 18 Temperature, Heat, First Law of Thermodynamics	18(1-6)	18(Q11, P8,14,15,26,31,35,41,48,49,77,89)
Ch. 19 Kinetic Theory of Gasses	19(1-9)	19(Q3,10, P3,4,16,44,47,55,75)
Ch. 20 Entropy, Second Law of Thermodynamics	20(1-8)	TBD
Exam #3		
Final Exam		

Important Information for Physics 20700 PP (honors) students:

Course Objectives: Students are expected to understand the basic physics involved in mechanics (the study of motion and its causes) and in thermodynamics (the study of heat and work) that is needed for science and engineering. The emphasis will be on analytical reasoning and problem-solving skills. A list of course objectives is given below.

Reading Assignment: The text material that will be covered in class each day is listed on the Class schedule. You should read the indicated sections in the textbook before coming to class. Note that we will cover one or two chapters of the text every week. Solutions of some illustrative examples will be presented in lecture. You can try them before coming to class!
Some of the reading assignments may be changed in order to incorporate elements of modern physics, such as special theory of relativity and analytical dynamics.

Homework: WileyPlus homework assignments (10%)

Flyers with WileyPlus registration information for each section will be posted on Blackboard Content.
Homework (NOT the Recommended problems from this Syllabus) will be assigned on a weekly basis.
Selected homework problems will be discussed and solved during the lecture.
In addition to the listed problem assignments, more difficult calculus-based problems may be assigned and discussed in class.
Look for announcements on Blackboard!

Grades:　　Student performance will be based on the following components:
　　　　　　　Exams　(3 midterms + final)　80%
　　　　　　　Homework assignments　　　10%
　　　　　　　Lab reports (7)　　　　　　10%
　　　　　　　Note that attendance will be taken at every class. Also, class participation is essential.

Exams: There will be three **in-person** midterm exams (80 min.) and a final exam (140 min.) that counts the same as two midterm exams. No exam grades will be dropped and no make-ups will be given except in the case of documented illness.

Effort required: <u>Don't underestimate the amount of effort required for you to succeed in this course</u>. Many students, in particular those who have not taken a previous course in physics, will need to spend 5-10 hours per week, <u>every week</u>, studying physics and doing the assigned homework problems, <u>in addition to the time spent in lecture, recitation and lab</u> (7 hours per week).

Academic Integrity: Academic dishonesty is prohibited in the City University of New York and is punishable by penalties, including failing grades, suspension, and expulsion.

Course objectives: After successfully completing this course, students should be able to
1. recognize and use SI units and be able to use vectors and their components.
2. understand the relationships between position, velocity, acceleration and time in the motion of physical objects
3. understand the concepts of force and equilibrium and their relation to Newton's laws of motion.
4. understand and apply the concepts of work and energy, including kinetic and potential energy; understand and be able to use the principle of conservation of energy.
5. understand and apply the concepts of momentum and impulse; understand and be able to use the principle of conservation of momentum.
6. understand how to describe the rotation of physical objects; understand the concept of torque as applied to the equilibrium of objects.
7. understand gravitational interactions and their relationship to satellite motion and Kepler's laws.
8. understand the phenomenon of simple harmonic motion.
9. understand and apply the basic principles of fluid mechanics as applied to buoyancy and fluid flow.
10. understand the properties of temperature and heat.
11. understand and apply the first and second laws of thermodynamics involving work, heat and internal energy.

Please note:

For student majoring in Physics, which may as well apply to any other science and engineering students, the following outcomes for the undergraduate program leading to the B.S. degree in physics have been established. The Department of Physics endeavors to have students:

A. employ scientific and quantitative reasoning
1. to analyze a variety of physical phenomena at an introductory level,
2. to understand the core physical theories with mathematical rigor,
3. in studying a specialized or applied field of physics;

B. design and conduct experiments to acquire and interpret data;

C. utilize computers for data analysis and numerical computations;

D. convey technical information effectively through written reports and manuscripts;

E. communicate scientific results in a professional manner through oral presentations; and,

F. learn to carry out research through the guidance of faculty mentors.