

PHYS1000 — The Physical Universe

Course code: PHYS 1000

Title: The Physical Universe

Number of hours, credits: 3 class hours, 3 credits

Catalog Description:

This course is designed to introduce the physical concepts that explain the workings of the universe to non-science majors. The use of mathematics is limited and subordinate to the physical concepts being addressed. Examples from daily life are used to both illustrate the physical concepts and make them relevant to students. Laboratory exercises are performed in the classroom to explain the scientific method and to allow students to learn how to perform experiments and compose a lab report.

Pre/Co-requisites: MAT1175 or MAT1190 or higher

Recommended or typical texts: The Physics of Everyday Phenomena, Griffith, 7th Edition

Sample sequence of topics and approximate time allocations:

Week	Lecture	Lab	Chapters
1	Scientific Method, Motion		1,2
2	Falling Object, Newtons Laws		3,4
3	Gravity, Circular Motion	Free Fall	5
4	Energy, Momentum		6, 7
5	Fluids, Heat	Energy Conservation	9, 10
6	Entropy		11
7	Electrostatics, Circuits	Calorimetry	12, 13
8	Magnets, Electromagnetism		14
9	Waves, Light	Induction	15,16
10	Optics, Image formation		17
11	The atom, spectra, quantum mechanics	Lenses	18
12	Nuclear physics, radioactive decay		19
13	Relativity, special and general		20
14	Particle physics, Cosmology, superconductors		21
15	Review, Final		All

Intended learning outcomes:

Course specific:

Outcomes	Method of assessment
For successful completion of the course, students should be able to:	Instructional Activity, Evaluation Methods and Criteria
Understand velocity, acceleration, Newton's laws of motion, and forces such as gravity	Laboratory reports and exams
Display a comprehension of work, energy, momentum and their conservation laws	Laboratory reports and exams
Understand fluids, heat and the second law of thermodynamics	Laboratory reports and exams
Understand electrical forces, voltage, electric circuits and magnetism	Laboratory reports and exams
Display an understanding of waves, light, sound, lenses and mirrors	Laboratory reports and exams
Understand the structure of the atom and nuclear forces	Laboratory reports and exams
Have an appreciation of relativity, particle physics and cosmology	Laboratory reports and exams

General Education:

Outcomes	Method of assessment
For successful completion of the course, students should be able to:	Instructional Activity, Evaluation Methods and Criteria
Apply the scientific method to explore natural phenomena, including hypothesis development, observation, experimentation, measurement, data analysis, and data presentation	Laboratory reports and exams
Use the tools of a scientific discipline to carry out collaborative laboratory investigations	Laboratory reports
Gather, analyze, and interpret data and present it in an effective written laboratory or fieldwork report.	Laboratory reports
Identify and apply research ethics and unbiased assessment in gathering and reporting scientific data.	Laboratory reports

Scope of assignments and other course requirements: Students will prepare homework and laboratory reports. There will be five laboratory exercises during the semester which will be written up and submitted as laboratory reports. There will be two exams during the semester and a final exam at the end.

Grading Rubric - The following rubric describes how lab reports will be graded, exams will cover the material as described in the table above.

Percentage	Section	Goal
20%	Introduction and Procedure	Understand a laboratory manual, follow a procedure.
20%	Data	Carry out collaborative laboratory investigation, apply unbiased assessment in gathering an reporting data.
20%	Analysis	Analyze and interpret data and present it in effective manner.
20%	Questions	Understand relevant theory as applied to this experiment.
20%	Conclusions	Apply scientific method including hypothesis testing, data analysis and data presentation.

Method of grading:

Students will be evaluated through laboratory reports and exams. The final grade will be based on a weighted average of the grades from the reports and exams as follows:

Two Exams 40%

Final Exam 25%

Lab Reports 35%

College academic integrity policy:

Students and all others who work with information, ideas, texts, images, music, inventions, and other intellectual property owe their audience and sources accuracy and honesty in using, crediting, and citing sources. As a community of intellectual and professional workers, the College recognizes its responsibility for providing instruction in information literacy and academic integrity, offering models of good practice, and responding vigilantly and appropriately to infractions of academic integrity. Accordingly, academic dishonesty is prohibited in The City University of New York and at New York City College of Technology and is punishable by penalties, including failing grades, suspension, and expulsion.

College Policy on Absence/Lateness

A student may be absent without penalty for 10% of the number of scheduled class meetings during the semester as follows:

Class Meets Allowable Absences

1 time/week 2 classes

2 times/week 3 classes

3 times/week 4 classes

Date of most recent revision of this document: October 17, 2012

Technology statement:

Before entering the course, students should be familiar with the use of a scientific calculator. During the course students will learn to use MS Word (equation editor, tables and inserting figures) and MS Excel (spreadsheet calculations and graphing).