

VILLANOVA UNIVERSITY

Dr. A. J. PHARES

PHYSICS 1010-1011

FALL 1997

SYLLABUS**COURSE OVERVIEW**

1. The laboratory experience plays a central role in achieving a working knowledge of the fundamental concepts. Laboratory techniques of data analysis include statistics and computer programming.
2. Mathematics is harmoniously incorporated into the teaching of physics.
3. Applications cover a wide variety of problems relating to other sciences.
4. Tests require the ability to provide a complete explanation of the physical concepts and fundamental laws, and the ability to solve problems.
5. At every class or laboratory session, students are required to have a right triangle, a 30cm ruler, a protractor, a compass (to draw circles), and a scientific calculator.

OBJECTIVES Students are expected to achieve a better understanding of the fundamental concepts, learn the elements of theoretical and experimental physics, while gaining insight in the extent of the modern applications of the conservation laws.

TEXTBOOK College Physics by Tipler will be used only as a reference and is not required.

LECTURE NOTES REQUIREMENT AND WORK ETHICS Tests will be based on the material covered in both lecture and laboratory sessions. Lecture notes are required but not graded. The effort in reorganizing and rewriting the notes taken in class is essential for the student to reach the level and depth of understanding required in this course. Equally important is the ability to explain and work out (closed notes) all the problems done in class, as mentioned above.

LABORATORY REPORTS

1. A laboratory report is due a week after the corresponding experiment is performed.
2. Students working in the same group have the same data but their respective reports should reflect individual effort. The use of wordprocessors to generate reports is encouraged but not required.
3. A report should consist of the following parts:
 - I. Objectives
 - II. Experimental Set-up and Underlying Theory
 - III. Data (to be presented in tabular form)
 - IV. Analysis of the data should include (as appropriate):
 - Graphical Analysis (clearly linking the theory to slope and intercept when the graph is expected to be linear)
 - Statistics (including the level of confidence in the final results)
 - V. Conclusion (discuss the reasons for either the success or failure of the experiment based on all the previous parts.)
4. Neatness and format will account for 20% of the grade. If a report has too much to be desired, it will be returned for resubmission within a week.

TESTS/FINAL EXAMINATION (PHYSICS 1010)

There will be 6 equally weighted tests (45 minutes), and a comprehensive final examination (150 minutes). The lowest grade received on the tests will be dropped. There will be no make-up, and a missed test will be equivalent to a zero.

ATTENDANCE TO LECTURES AND LABORATORY SESSIONS

Attendance is **REQUIRED** and will be recorded. Failure to show up on time will be considered as an absence. An excused absence should be provided to make up for a missed laboratory session; no more than one make-up will be allowed.

GRADING OF PHYSICS 1011

The final letter grade is based on the equally weighted lab reports as follows:

F < 60%	60% < D- < 63%	63% < D < 66%	66% < D+ < 70%
	70% < C- < 73%	73% < C < 76%	76% < C+ < 80%
	80% < B- < 83%	83% < B < 86%	86% < B+ < 90%
	90% < A- < 95%	95% < A	95% ≤ A+.

GRADING OF PHYSICS 1010

Because of the importance given to the laboratory experience in the learning of the fundamentals, and the amount of writing and data analysis required in laboratory reports, the final grade in Physics 1010 is composed of the laboratory reports, quizzes, and final examination apportioned as follows:

Lab reports	Tests	Final Exam
10%	60%	30%

The final grade scale is:

F < 50%	50% < D- < 53%	53% < D < 56%	56% < D+ < 60%
	60% < C- < 64%	64% < C < 68%	68% < C+ < 72%
	72% < B- < 76%	76% < B < 80%	80% < B+ < 85%
	85% < A- < 93%	93% < A	93% ≤ A+.

TENTATIVE LABORATORY SCHEDULE

Thermal Expansion (small changes and rate of changes)	August 25
Hooke's Law (mass, weight, graphing and data analysis)	September 8
Concurrent Forces in 2 & 3 Dimensions	September 15
Pendulum (errors and statistical data analysis)	September 22
Objects in Free Fall	September 29
Newton's Second Law and Friction	October 6
Circular Motion	October 20
Projectile Motion and Collision	October 27
Center of Mass of a Loaded Meter Stick	November 3
Torques and Static Equilibrium: Crane	November 10
Hydrostatics & Density Measurement	November 17
Harmonic Motions: Spring and Pendulum	November 24
Standing Waves on a String	December 1
Review	December 8

The necessary but not sufficient condition to achieve a passing grade is the submission of all reports by

December 8, 1996; no reports will be accepted after that date.

TENTATIVE LECTURES & TESTS

Aug.	26	Standards, scientific notations, significant figures, order of magnitude
	28	Fundamental forces: gravitation, electromagnetism, nuclear forces
Sep.	2	Frame of reference, position, and displacement (review of trigonometry)
	4	Exercises: Cartesian components, magnitude and direction
	9	<u>Test 1</u> - Followed by a lecture on Velocity and Acceleration
	11	Exercises
	16	Circular Motion
	18	Inertial frames, Newton's 1st Law - Exercises: rocket's propulsion
	23	Newton's 2nd and 3rd Law - Exercises
	25	<u>Test 2</u> - Followed by Newton's Universal Law of Gravitation
	30	Exercises: planets and satellites
Oct.	2	Exercises: friction (static and kinetic)
	7	Exercises: projectile motion
	9	<u>Test 3</u> - Followed by an introduction to Center of Mass
	21	Torque, angular momentum, moment of inertia
	23	Exercises: collisions
	27	Exercises: static equilibrium
Oct.	30	Mechanical work, kinetic energy, gravitational potential energy
Nov.	4	<u>Test 4</u> - Followed by exercises on energy conservation
	6	Exercises: escape speed - black holes
	11	Hydrostatics: Archimedes and Pascal - Exercises
	13	Hydrodynamics: Exercises
	18	<u>Test 5</u> - Followed by an introduction to Oscillations & Waves
	20	Periodic waves: speed, frequency, wavelength
Dec.	2	Doppler Effect - Exercises
	4	Energy transported in a wave - Exercises
	9	<u>Test 6</u> - Followed by a review session
	11	Review

Office Hours

Students are expected to study on a daily basis and seek help directly from their instructor as soon as they encounter a difficulty. Studying just before a test may not be sufficient to reach the level and depth of understanding expected in this course. Dr. Phares' office is located in Mendel 372. You may arrange for an appointment either directly with him after class, or by calling his office at 519-4889; if not available, leave a voice mail message and he will try to get back to you as soon as possible.