

PHYSICS 201 - GENERAL PHYSICS I

Sections A & E, Fall 2014

Instructor: Tuan Nguyen

Contact: Office: Science Complex P-111

Phone: (609) 309-9252

Email: nguyena@tcnj.edu

Lectures: TuFr 8-9:20 am (201A) & 2-3:20 pm (201E), Science Complex P-317

Labs: Tu 9:30-11:20 am & 3:30-5:20 pm, Fr 9:30-11:20 am, Science Complex P-312

Office Hours: W 9-10 am, ThFr 4-5 pm, or by appointment

Pre/Co-requisite: MATH 125 or Math 127

Required Materials:

Textbook: *Fundamentals of Physics, Vol 1*, 9th or 10th ed. by Halliday, Resnick, and Walker

Lab Manual: *General Physics Lab Manual*, 5th ed. by Ochoa, Dalafave, and Gleeson

Description:

This is a calculus based introductory physics course, the first of a two semester sequence. Topics covered include linear & circular motion, Newton's Laws, linear & angular momentum, conservation of energy, gravitation, oscillations, and fluids. Conceptual understanding is reinforced using laboratory experiments, demonstrations, and homework assignments.

Objectives:

1. To provide a general foundation of physics knowledge and concepts.
2. To introduce basic physical and analytical reasoning skills.
3. To gain some understanding of how everyday devices and technologies work.
4. To figure-out when you've been had the next time you watch a movie.
5. To impress others with your amazing knowledge of physics.

Topics:

1. Physics and Measurement (Ch. 1)

2. Motion in One Dimension (Ch. 2)

Position and displacement. Velocity. Acceleration. Constant acceleration. Free-fall acceleration.

3. Motion in Two Dimensions (Ch. 3-4)

Vectors. Position and displacement vectors. Velocity and acceleration vectors. Projectile motion. Uniform circular motion. Tangential and centripetal Acceleration. Relative motion.

4. Force and Motion (Ch. 5-6)

Newton's first law. Mass and inertia. Newton's second and third laws. Applications of Newton's laws. Free-body diagram. Friction. Weight. Centripetal force.

Midterm Exam 1 Chapters 1-6

5. Work and Energy (Ch. 7-8)

Kinetic energy. Work. Work-kinetic energy theorem. Power. Potential energy. Gravitational and elastic potential energy. Work done by non-conservative forces. Conservation of energy.

6. Linear Momentum and Collisions (Ch. 9)

Center of mass. Concept of linear momentum. Conservation of linear momentum. Collisions. Impulse. Elastic collisions. Inelastic collisions. Collisions in two dimensions.

7. Rotation, Torque, and Angular Momentum (Ch. 10-11)

Translation and rotation. Angular velocity and acceleration. Constant angular acceleration. Relations between linear and angular variables. Torque. Torque and angular acceleration. Work and rotational kinetic energy. Angular momentum. Conservation of angular momentum.

8. Static Equilibrium (Ch. 12)

Requirements of equilibrium: vanishing of forces and of torques. Center of gravity.

Midterm Exam 2 Chapters 7-12**9. Gravitation** (Ch. 13)

Newton's Law of Gravitation. Gravitational Potential Energy. Escape speed. Kepler's Laws.

10. Oscillations (Ch. 15)

Simple Harmonic Motion. Pendulum. Forced Oscillations. Resonance.

11. Fluids (Ch. 14)

Pressure. Pascal's Principle. Archimedes' Principle. Equation of Continuity. Bernoulli's Equation.

Final Exam Comprehensive**Participation:**

While class attendance is not mandatory, it is highly recommended. The lectures are meant to supplement the text and will at times greatly differ from it. Homework hints will only be given during class. To get more out of this course, class interaction is highly encouraged. Feel free to provide feedback during lecture, during office hours, or by email. In addition, now and then, we will form small groups to work on problems.

Quizzes:

Quizzes will be randomly given throughout the semester. They will be multiple choice and based upon previous lecture material. Five points are given for correct answers and three points for incorrect ones.

Homework:

Problem solving is an integral part of the course. Thus, homework problems from the textbook will be assigned every week. You are encouraged to work together on problems but the final write-up must be your own. Homework will be due on Fridays at 5pm to be slipped under my office door.

Labs:

Students must complete both the laboratory exercises and the laboratory notebook in a satisfactory manner. Students are expected to be in the lab on time, and points will be deducted for tardiness; if a student is more than 20 minutes late he or she will receive a

zero grade for that lab. Pre-lab worksheets are to be done before class and turned with the lab report.

- Lab 1. Mass Density and Error Analysis
- Lab 2. Motion with Constant Acceleration.
- Lab 3. Projectile Motion
- Lab 4. Newton's Second Law
- Lab 5. Centripetal Force
- Lab 6. Ballistic Pendulum
- Lab 7. Collisions in One Dimension
- Lab 8. Conservation of Angular Momentum
- Lab 9. Oscillatory Motion

4th Hour

In this class, the deep learning outcomes associated with TCNJ's 4th hour are accomplished by a series of rigorous educational assignments that extend beyond the typical scheduled class time. These include activities conducted in the scheduled laboratory section, out-of-class problem sets, and out-of-class online learning activities such as video lectures and reading assignments.

Cheating:

Cheating or academic dishonesty of any kind will not be tolerated. Cheating includes but is not limited to copying from classmates, solution manuals, or online solution databases. If anyone is caught cheating in any way, he or she will receive at minimum of zero on the assignment, and potentially an incomplete for the course.

Grading:

Coursework will be weighted by the following:

5% Quiz	15% Midterm Exam 1
15% Homework	15% Midterm Exam 2
15% Lab	35% Final Exam

The final course grade will be determined by the following fixed scale:

Grade	Total	Grade	Total
A	93.0-100	C	73.0-76.9
A-	90.0-92.9	C-	70.0-72.9
B+	87.0-89.9	D+	67.0-69.9
B	83.0-86.9	D	60.0-66.9
B-	80.0-82.9	F	0.0-59.9
C+	77.0-79.9		

SELECTED TCNJ POLICIES

TCNJ's final examination policy is available on the web:

<http://policies.tcnj.edu/policies/digest.php?docId=9136>

Attendance:

Every student is expected to participate in each of his/her courses through regular attendance at seminar and colloquium sessions. It is further expected that every student will be present, on time, and prepared to participate when scheduled class sessions begin. While attendance itself is not used as a criterion for academic evaluations, grading in this course is based on participation in class discussion so a student may be penalized for failure to perform satisfactorily in the required activities. No make-ups or extensions will be given unless a student has a genuine emergency. If a student misses an exam or assignment deadline they must contact the instructor within 36 hours to explain the situation; otherwise the student will earn a zero for that exam or assignment. Students who must miss classes due to participation in a field trip, athletic event, or other official college function should arrange with their instructors for such class absences well in advance. In every instance, however, the student has the responsibility to initiate arrangements for make-up work.

TCNJ's full attendance policy is available on the web:

<http://policies.tcnj.edu/policies/digest.php?docId=9134>

Academic Integrity Policy:

Academic dishonesty is any attempt by the student to gain academic advantage through dishonest means, to submit, as his or her own, work which has not been done by him/her or to give improper aid to another student in the completion of an assignment. Such dishonesty would include, but is not limited to: submitting as his/her own a project, paper, problem set, report, test, or speech copied from, partially copied, or paraphrased from the work of another (whether the source is printed, under copyright, or in manuscript form). Credit must be given for words quoted or paraphrased. The rules apply to any academic dishonesty, whether the work is graded or ungraded, group or individual, written or oral.

TCNJ's academic integrity policy is available on the web:

<http://policies.tcnj.edu/policies/digest.php?docId=7642>

Americans with Disabilities Act (ADA) Policy:

Any student who has a documented disability and is in need of academic accommodations should notify the professor of this course and contact the Office of Differing Abilities Services (609-771-2571). Accommodations are individualized and in accordance with Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1992.

TCNJ's Americans with Disabilities Act (ADA) policy is available on the web:

<http://policies.tcnj.edu/policies/digest.php?docId=8082>