

# GENERAL PHYSICS I

PHY 201

Instructor: Dr. Romulo Ochoa  
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Text: Fundamentals of Physics, Halliday, Resnick, & Walker (10<sup>th</sup> Ed.)

Web pages: [www.tcnj.edu/~ochoa/courses/GPI.htm](http://www.tcnj.edu/~ochoa/courses/GPI.htm)  
[Wiley Plus Electronic Homework](#)

## I. Course Description

Calculus based treatment of laws of classical mechanics, wave motion and sound. Understanding of the important principles is emphasized. Problem solving and laboratory work are integral parts of the course.

## II. Course Objectives

1. To provide a foundation in physics necessary for further study in science, engineering and technology.
2. To provide an appreciation of the nature of physics, its methods and its goals.
3. To contribute to the development of the student's thinking process through the understanding of the theory and application of this knowledge to the solution of practical problems.

## III. Course Outline

1. Physics and Measurement. (Ch. 1)  
Measuring things. International system of units. Changing units. Length, time and mass.  
Wiley Plus Electronic Homework 1
2. Motion in One Dimension. (Ch. 2)  
Motion. Position and displacement. Velocity. Acceleration. Constant acceleration. Free-fall acceleration.  
Wiley Plus Electronic Homework 2
3. Vectors. (Ch. 3)  
Vectors and scalars. Adding vectors geometrically. Components of vectors. Unit vectors. Adding vectors by components.  
Wiley Plus Electronic Homework 3.
4. Motion in Two Dimensions. (Ch. 4)  
Position and displacement vectors. Velocity and acceleration vectors. Projectile motion. Uniform circular motion. Tangential and Centripetal Acceleration. Relative motion.  
Wiley Plus Electronic Homework 4

Test 1

Date: TBA

5. Newton's Laws of Motion and Applications. (Ch. 5-6)  
Concept of force. Newton's first law. Mass. Newton's second and third laws.  
Applications of Newton's laws. Friction. Drag force and terminal speed.  
Dynamics of circular motion.  
Wiley Plus Electronic Homework 5 & 6.
6. Work and Conservation of Energy.- (Ch. 7-8)  
Kinetic energy. Work. Power. Potential energy. Gravitational and elastic  
potential energy. Work done by nonconservative forces. Conservation of energy.  
Wiley Plus Electronic Homework 7 & 8.

Test 2

Date: TBA

7. Linear Momentum and Collisions.- (Ch. 9)  
Concept of linear momentum. Conservation of momentum. Systems with varying  
mass. Collisions. Impulse and linear momentum. Elastic collisions. Inelastic  
collisions. Collisions in two dimensions. Center of mass.  
Wiley Plus Electronic Homework 9.
8. Rotation of a Rigid Object about a Fixed Axis (Ch. 10)  
Translation and rotation. Angular velocity and acceleration. Constant angular  
acceleration. Relating the linear and angular variables. Torque. Torque and  
angular acceleration. Work and rotational kinetic energy.  
Wiley Plus Electronic Homework 10.
9. Angular Momentum (Ch. 11)  
The vector torque. Angular momentum. Conservation of angular momentum.  
Wiley Plus Electronic Homework 11.
10. Static Equilibrium.- (Ch. 12)  
Requirements of equilibrium. Center of gravity. Applications.  
Wiley Plus Electronic Homework 12.

Final Exam

#### **IV. Laboratory**

- Lab. 1. Mass Density and Error Analysis.  
Lab. 2. Motion with constant acceleration & Position Templates.  
Lab. 3. Vector analysis - addition of displacements. Intro to VPython.  
Lab. 4. Projectile motion. VPython simulation.  
Lab. 5. Test 1 Preparation – peer instruction exercises.  
Lab. 6. Newton's Second Law.  
Lab. 7. Friction.  
Lab 8. Centripetal Force.  
Lab. 9. Hooke's law: Spring - mass system. VPython simulation.  
Lab. 10. Test 2 Preparation – peer instruction exercises.  
Lab. 11. Linear Collisions.  
Lab. 12. Ballistic pendulum.

Lab. 13. Torques and Conservation of Angular Momentum  
Lab. 14. Exam Preparation – peer instruction exercises.

#### V. Assessment of Student Performance

1. Electronic Homework (10% of course grade)
2. tests (35% of course grade)
3. final exam (35% of course grade)
4. lab. grade (18% of course grade)
5. Lab report (2% of course grade)

For lab grade student must complete in a satisfactory manner the laboratory exercises and the laboratory notebook. Students are expected to be in the lab on time, **points will be deducted for tardiness** (if a student is more than 20 minutes late he/she will receive a zero grade for that lab). Lab report to be prepared based on instructions posted on Canvas.

Grading Scale	
Final Score	Letter Grade
92.5 - 100	A
89.5 – 92.4	A-
86.5 – 89.4	B+
82.5 – 86.4	B
79.5 – 82.4	B-
76.5 – 79.4	C+
72.5 – 76.4	C
69.5 – 72.4	C-
66.5 – 69.4	D+
59.5 – 66.4	D
0 – 59.4	F

#### Fourth Hour:

In this class, the deep learning outcomes associated with TCNJ's 4<sup>th</sup> hour are accomplished through laboratory experiments.

#### VI. Selected TCNJ Policies

##### Final Examinations

The final exam is not scheduled until the middle of the semester. Therefore do not plan on any travel until after the last day of the exam period. TCNJ's final examination policy is available on the web:

<http://academicaffairs.pages.tcnj.edu/college-governance/policies/final-examevaluationreading-days-policy/>

##### Attendance

*Every student is expected to participate in each of his/her courses through regular attendance at all class 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 quizzes to*

*be given at the beginning of several classes. 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 or for a religious holiday 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 at:

<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 at:

<http://policies.tcnj.edu/policies/viewPolicy.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 at:*

<http://affirm.pages.tcnj.edu/key-documents>