



# INSTRUCTIONAL PACKAGE

PHY 221

University Physics I

Effective Term  
Fall 2020

# INSTRUCTIONAL PACKAGE

## Part I: Course Information

Effective Term: 2019-2020

COURSE PREFIX: PHY 221

COURSE TITLE: University Physics I

CONTACT HOURS: 3-3

CREDIT HOURS: 4

### **RATIONALE FOR THE COURSE:**

Completion of PHY 221 enables the student to gain an appreciation and working knowledge of fundamental principles in the area of physics. These concepts are approached through the development of problem-solving skills, which helps prepare students for future careers in science fields. Additionally, this course applies concepts learned in calculus to topics in physics, therefore enhancing cross-curriculum instruction.

### **COURSE DESCRIPTION:**

This is the first of a sequence of courses. The course includes a calculus-based treatment of the following topics: vectors, laws of motion, rotation, vibratory, and wave motion. This course is transferable to public senior institutions as part of the South Carolina Commission on Higher Education Statewide Articulation Agreement.

### **PREREQUISITES/CO-REQUISITES:**

Credit level MAT 130 Minimum Grade of C or Credit level MAT 130 Minimum Grade of TC or Credit level MAT 140 Minimum Grade of C or Credit level MAT 140 Minimum Grade of TC

**Online/Hybrid** courses require students to complete the DLi Online Student Orientation prior to completing an online course. The DLi Online Student Orientation can be found in WaveNet, under the My Student tab.

### **REQUIRED MATERIALS:**

Please visit the Bookstore online site for most current textbook information. Use the direct link below to find textbooks.

[BOOKSTORE](#).

Enter the semester, course prefix, number and section when prompted and you will be linked to the correct textbook.

### **ADDITIONAL REQUIREMENTS:**

A scientific calculator and graph paper.

For Hybrid/Online Students Only: Each student will be required to view an orientation PowerPoint presentation during the first week of class. This presentation can be found on the course homepage in

D2L under News. After viewing the presentation, all online students must complete the orientation quiz, which can be found under the dropdown assignment menu. A student will not be considered officially enrolled in the course until the presentation has been viewed and the quiz completed with a 100% score. Any submitted work from the student including discussion posts, assignments, etc. will not be given a grade until the presentation has been viewed and the quiz has been submitted. Failure to view the presentation and take the quiz before midnight on the last day to add/drop classes will result in the student being automatically dropped from the course.

### **TECHNICAL REQUIREMENTS:**

Access to Desire2Learn (D2L), HGTC's student portal for course materials.  
WaveNet and D2L email access.

### **STUDENT IDENTIFICATION VERIFICATION**

Students enrolled in online courses will be required to participate in a minimum of one (1) proctored assignment and/or one (1) virtual event to support student identification verification. Please refer to your Instructor Information Sheet for information regarding this requirement.

### **CLASSROOM ETIQUETTE:**

As a matter of courtesy to other students and your professor, please turn off cell phones and other communication/entertainment devices before class begins. If you are monitoring for an emergency, please notify your professor prior to class and switch cell phone ringers to vibrate.

**NETIQUETTE:** is the term commonly used to refer to conventions adopted by Internet users on the web, mailing lists, public forums, and in live chat focused on online communications etiquette. For more information regarding Netiquette expectations for distance learning courses, please visit [Online Netiquette](#).

### **ACADEMIC DISHONESTY:**

All forms of academic dishonesty, as outlined in the Student Code in the HGTC catalog, will NOT be tolerated and will result in disciplinary action. Anyone caught cheating or committing plagiarism (Defined in the code as: "The appropriation of any other person's work and the unacknowledged incorporation of that work in one's own work offered for credit") will be given a grade of a zero for that assignment and reported to the Senior VP of Academic Affairs, in accordance with the student handbook. A second offense will result in the student being withdrawn from the course with a "WF" and charges being filed with the Chief Student Services Officer.

## **Part II: Student Learning Outcomes**

### **COURSE LEARNING OUTCOMES and ASSESSMENTS\*:**

A student will demonstrate an understanding of Concepts of Motion by:

- constructing motion diagrams.
- utilizing the particle model.
- applying the concepts of position and time using vectors.

defining velocity vectors and their application to motion diagrams.  
defining linear acceleration and their application to motion diagrams.  
explaining motion in one dimension using position v. time graphs.  
applying a problem-solving strategy to correctly solve problems in all areas of physics.  
applying rules for significant figures and including appropriate units.

A student will demonstrate an understanding of Kinematics in One Dimension by:

analyzing mathematically uniform motion.  
determining instantaneous velocity using calculus.  
determining position from velocity using calculus.  
explaining motion with constant acceleration.  
explaining the meaning of a free fall.  
explaining motion on an inclined plane.  
determining instantaneous acceleration using calculus.

A student will demonstrate an understanding of the Use of Vectors and Coordinate Systems by:

distinguishing between scalars and vectors.  
adding and subtracting vectors algebraically and graphically.  
utilizing coordinate systems to apply vector components.

A student will demonstrate an understanding of Kinematics in Two Dimensions by:

determining velocity and acceleration using calculus.  
explaining projectile motion and calculating all quantities associated with it.  
explaining relative motion.  
explaining uniform circular motion and defining the units associated with it.  
solving instantaneous velocity problems using calculus.  
solving for velocity and acceleration in uniform circular motion using calculus.  
explaining non-uniform circular motion and calculating angular acceleration.

A student will demonstrate an understanding of Force and Motion by:

illustrating force vectors.  
categorizing and identifying forces.  
interpreting Newton's First and Second Laws.  
illustrating and utilizing free-body diagrams.

A student will demonstrate an understanding of Motion along a Line by:

distinguishing between static and dynamic equilibrium.  
interpreting Newton's Second Law to solve dynamic problems.  
distinguishing between mass, weight and gravity.  
distinguishing between static, kinetic and rolling friction.  
defining drag.

A student will demonstrate an understanding of Newton's Third Law by:

- defining and analyzing interacting objects.
- solving interacting-objects problems using Newton's Third Law.
- solving problems that involve ropes and pulleys.

A student will demonstrate an understanding of Motion in a Plane by:

- interpreting Newton's Second Law in component form to explain dynamics in two dimensions.
- explaining dynamics of uniform circular motion.
- explaining circular orbits.
- defining fictitious forces.
- explaining dynamics of non-uniform circular motion.

A student will demonstrate an understanding of Impulse and Momentum by:

- explaining collisions using the concepts of momentum and impulse.
- utilizing the impulse-momentum-impulse theorem and relating it to Newton's Second Law.
- applying the Law of Conservation of Momentum in collisions of two or more objects.
- defining and solving problems on inelastic collisions.
- defining and solving problems on explosions.
- applying momentum concepts into 2 dimensions.

A student will demonstrate an understanding of Energy by:

- explaining the basic energy model for isolated systems.
- explaining the concept of kinetic energy and gravitational potential energy.
- utilizing gravitational potential energy to solve non free fall situations such as inclined planes and ballistic pendulums.
- explaining the relationship between restoring forces and Hooke's Law.
- utilizing calculus to derive the equation for elastic potential energy.
- utilizing elastic potential energy in calculations involving projectiles.
- constructing energy diagrams in order to visualize motion based on energy considerations.
- defining and solving problems on elastic collisions.

A student will demonstrate an understanding of Work by:

- modifying the basic energy model to include the environment.
- making use of calculus to determine the relationship between work and kinetic energy.
- explaining the work-kinetic energy theorem.
- solving for work using the work-kinetic energy theorem for constant forces.
- solving for work using the work-kinetic energy theorem for variable forces.
- explaining the meaning of conservative and non-conservative forces.
- utilizing calculus to find force from potential energy.
- explaining thermal energy using kinetic and potential energy at the microscopic level and dissipative forces.
- utilizing the conservation of energy to solve energy problems.
- defining and calculating power in various energy situations.

A student will demonstrate an understanding of Rotational Motion by:

- explaining the concept of rotation about the center of mass.
- developing center of mass equations.
- explaining the concept of moment of inertia and calculating its value for objects of various shapes.
- solving rotational kinetic energy problems.
- determining torque when given a force and the lever arm distance at which it is applied.
- determining angular acceleration using its relationship with torque.
- solving problems of rotation about a fixed axis.
- applying the static condition for equilibrium as it applies to torque and forces.
- determining the kinetic energy of a rolling object.
- demonstrating rotational motion using vectors.
- defining angular momentum for particles and rigid bodies.
- applying the conservation of angular momentum in rotational problems.

A student will demonstrate an understanding of Oscillations by:

- explaining what is meant by simple harmonic motion and recognizing all terms associated with simple harmonic motion.
- defining the relationship between simple harmonic motion and circular motion using specific examples.
- making use of the phase constant in calculations on simple harmonic motion.
- solving for energy in simple harmonic motion.
- solving equations of motion in simple harmonic motion.
- explaining vertical oscillations.
- relating pendulum motion to simple harmonic motion.
- defining damped oscillations and calculating energy in those systems.
- explaining the relationship between driven oscillations and resonance.

***\*Students – please refer to the Instructor’s Course Information sheet for specific information on assessments and due dates.***

## **Part III: Grading and Assessment**

### **EVALUATION OF REQUIRED COURSE MEASURES/ARTIFACTS\***

Students’ performance will be assessed and the weight associated with the various measures/artifacts are listed below.

#### **EVALUATION\***

Lecture	75%
Lab	25%
Total	100%

***\*Students, for the specific number and type of evaluations, please refer to the Instructor’s Course Information Sheet.***

## **GRADING SYSTEM:**

Please note the College adheres to a 10 point grading scale A = 100 – 90, B = 89- 80, C = 79 – 70, D = 69 – 60, F = 59 and below.

Grades earned in courses impact academic progression and financial aid status. Before withdrawing from a course, be sure to talk with your instructor and financial aid counselor about the implications of that course of action. Ds, Fs, Ws, WFs and Is also negatively impact academic progression and financial aid status.

The Add/Drop Period is the first 5 days of the semester for **full term** classes. Add/Drop periods are shorter for accelerated format courses. Please refer to the academic calendar for deadlines for add/drop ([ACADEMIC CALENDAR](#)). You must attend at least one meeting of all of your classes during that period. If you do not, you will be dropped from the course(s) and your Financial Aid will be reduced accordingly.

## **Part IV: Attendance**

Horry-Georgetown Technical College maintains a general attendance policy requiring students to be present for a minimum of 80 percent (80%) of their classes in order to receive credit for any course. Due to the varied nature of courses taught at the college, some faculty may require up to 90 percent (90%) attendance. Pursuant to 34 Code of Federal Regulations 228.22 - Return to Title IV Funds, once a student has missed over 20% of the course or has missed two (2) consecutive weeks, the faculty is obligated to withdraw the student and a student may not be permitted to reenroll. **Instructors define absentee limits for their class at the beginning of each term; please refer to the Instructor Course Information Sheet.**

**For online and hybrid courses**, check your Instructor's Course Information Sheet for any required on-site meeting times. Please note, instructors may require tests to be taken at approved testing sites, if you use a testing center other than those provided by HGTC, the center may charge a fee for its services.

### **Lecture Attendance:**

For a 15-week course (fall and spring), the allowed number of absences for a MW or TR class is as follows: 6 absences are allowed for lecture, regardless of reason. For a lecture class that meets once a week, the allowed number of absences is three (3). When a student surpasses the allowed number of absences, the student will be dropped automatically from the course with a W or a WF. Remember, an absence is an absence, no matter if it is excused or not!

### **Lab Attendance:**

Students are allowed two (2) lab absences for a lab that meets weekly. When a student surpasses the allowed number of absences, the student will be dropped automatically from the course with a W or a WF.

### **Online/Hybrid Attendance:**

Students enrolled in distance learning courses (hybrid and online) are required to maintain contact with

the instructor on a regular basis to be counted as "in attendance" for the course. All distance learning students must participate weekly in an Attendance activity in order to demonstrate course participation. Students showing no activity in the course for two weeks (these weeks do not need to be consecutive) will be withdrawn due to lack of attendance.

### **Lab Attendance for Hybrid Courses:**

Students in hybrid classes in which labs only meet 5 or 6 times during the semester, must attend all lab sessions for its entirety. Failure to attend one lab will result in immediate withdrawal. Students in hybrid classes where labs meet every week, you are allowed one lab absence. When a student surpasses the allowed number of absences, the student will be dropped automatically from the course with a W or a WF.

## **Part V: Student Resources**



### **The Student Success and Tutoring Center (SSTC)**

The SSTC offers to all students the following **free** resources:

- 1. Academic coaches** for most subject areas, **Writing Center Support**, and **college success skills**.
- 2. On-line student success and academic support resources.**

Visit the SSTC website: [Student Success & Tutoring Center](#) and visit the student services tab in your WaveNet account to schedule appointments using TutorTrac. For more information, call: SSTC Conway, 349-7872; SSTC Grand Strand, 477-2113; and SSTC Georgetown, 520-1455 or go to the [Online Resource Center](#) to access on-demand resources any time.

### **TECH Central – Student Information Center**



TECH Central provides quality enrollment and collegiate guidance for students, faculty, and staff. Services include phone, walk-in, and online technical support for technology training and troubleshooting. Additionally, we offer support in Office 365, Outlook E-mail setup, and ID cards.

**Phone:** 843-349-5340

**Email:** [techcentral@hgtc.edu](mailto:techcentral@hgtc.edu)

**Text:** 843-357-8552

**TECH Talk (Live Chat):** Located on the "Home" tab in WaveNet.

**Website:** [www.hgtc.edu/techcentral](http://www.hgtc.edu/techcentral)



**Locations:**

Conway Building 1100, Room 132D  
Grand Strand Building 200, Room 136

**Student Testing:** (If course is offered in multiple format include this section, delete if only F2F sections are offered.)

Testing in an **online/hybrid** course may be accomplished in a variety of ways:

- Test administered within D2L
- Test administered in writing on paper
- Test administered through Publisher Platforms

Further more tests may have time limits and/or require a proctor.

Proctoring can be accomplished either face-to-face at an approved site or online through RPNOW, our online proctoring service. To find out more about proctoring services, please visit the [Online Testing](#) section of the HGTC's Testing Center webpage.

The **Instructor Information Sheet** will have more details on test requirements for your course.

**Disability Services:**

HGTC is committed to providing an accessible environment for students with disabilities. Inquiries may be directed to Beth Havens, Director of Student Development on the Conway Campus Jaime Davis, Counselor/Advisor on the Georgetown Campus or Kristin Griffin, Counselor on the Grand Strand Campus. These individuals will review documentation of the student's disability and, in a confidential setting with the student, develop an educational accommodation plan.

Note: It is the student's responsibility to self-identify as needing accommodations and to provide acceptable documentation. After a student has self-identified and submitted documentation of a disability, accommodations may be determined, accepted, and provided.

**Statement of Equal Opportunity/Non-Discrimination Statement**

Horry-Georgetown Technical College prohibits discrimination and harassment, including sexual harassment and abuse, on the basis of race, color, sex, national or ethnic origin, age, religion, disability, marital or family status, veteran status, political ideas, sexual orientation, gender identity, or pregnancy, childbirth, or related medical conditions, including, but not limited to, lactation in educational programs and/or activities.

Inquiries regarding the non-discrimination policies: Students and prospective student inquiries concerning Section 504, Title II, and Title IX and their application to the College or any student decision may be directed to the Vice President for Student Affairs, Dr. Melissa Batten, VP Student Affairs, Title IX Coordinator, Building 1100, Room 107A, Conway Campus, PO Box 261966, Conway, SC 29528-6066, 843-349-5228, Melissa.Batten@hgtc.edu. Employee and applicant inquiries concerning Section 504, Title II, and Title IX and their application to the College may be directed to the Vice President for Human Resources, Jacquelyne Snyder, VP Human Resources, Section 504, Title II, and Title IX

Coordinator, Building 200, Room 212A, Conway Campus, PO Box 261966, Conway, SC 29528-6066, 843-349-5212, [Jacquelyne.Snyder@hgtc.edu](mailto:Jacquelyne.Snyder@hgtc.edu).

**Title IX Requirements**

All students (as well as other persons) at Horry-Georgetown Technical College are protected by Title IX—regardless of their sex, sexual orientation, gender identity, part- or full-time status, disability, race, or national origin—in all aspects of educational programs and activities. Any student, or other member of the college community, who believes that he/she is or has been a victim of sexual harassment or sexual violence may file a report with the college’s Chief Student Services Officer, campus law enforcement, or with the college’s Title IX Coordinator, or designee.

\*Faculty and Staff are required to report incidents to the Title IX Coordinators when involving students. The only HGTC employees exempt from mandatory reporting are licensed mental health professionals (only as part of their job description such as counseling services).

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<p>Student and prospective student inquiries concerning Section 504, Title II, and Title IX and their application to the College or any student decision may be directed to the Vice President for Student Affairs.</p>	<p>Employee and applicant inquiries concerning Section 504, Title II, and Title IX and their application to the College may be directed to the Vice President for Human Resources.</p>
<p><b>Dr. Melissa Batten, VP Student Affairs</b>  <i>Title IX Coordinator</i></p> <p>Building 1100, Room 107A, Conway Campus          PO Box 261966, Conway, SC 29528-6066          843-349-5228  <a href="mailto:Melissa.Batten@hgtc.edu">Melissa.Batten@hgtc.edu</a></p>	<p><b>Jacquelyne Snyder, VP Human Resources</b>  <i>Section 504, Title II, and Title IX Coordinator</i></p> <p>Building 200, Room 212A, Conway Campus          PO Box 261966, Conway, SC 29528-6066          843-349-5212  <a href="mailto:Jacquelyne.Snyder@hgtc.edu">Jacquelyne.Snyder@hgtc.edu</a></p>