



# INSTRUCTIONAL PACKAGE

PHY 201

Physics I

Effective Term  
Fall 2019, Spring 2020

# INSTRUCTIONAL PACKAGE

## Part I: Course Information

Effective Term: 2019-2020

COURSE PREFIX: PHY 201

COURSE TITLE: Physics I

CONTACT HOURS: 3-3

CREDIT HOURS: 4

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

Completion of PHY 201 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 is designed to satisfy freshman-level physics requirements at other colleges.

### **COURSE DESCRIPTION:**

This is the first in a sequence of physics courses. Topics include mechanics, wave motion, sound, heat, electromagnetism, optics, and modern physics. 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 110 Minimum Grade of C or Credit level MAT 110 Minimum Grade of TC or Credit level MAT 111 Minimum Grade of C or Credit level MAT 111 Minimum Grade of TC or Credit level MAT 175 Minimum Grade of C or Credit level MAT 175 Minimum Grade of TC or Credit level MAT 176 Minimum Grade of C or Credit level MAT 176 Minimum Grade of TC or Multiple Measures Math 1

**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 Scientific Measurement by:

utilizing the metric system of measurement.

listing the standards used for length, mass, time and temperature.

utilizing scientific notation.  
interpreting the prefixes (such as k-, m-, M-,  $\mu$ -) used in describing quantities.  
relating all units associated with dimensions.  
defining and demonstrating the use of significant figures.  
demonstrating the ability to interconvert among various units of measure.  
identifying and applying all mathematical notations used in this class.  
demonstrating knowledge of each type of coordinate system discussed in class by converting from one to the other.

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

distinguishing between scalars and vectors.  
demonstrating the ability to add and subtract vectors.  
dividing a vector into its two component vectors.  
combining two component vectors into its resultant vector, with magnitude and direction expressed.

A student will demonstrate an understanding of Motion in One Direction by:

distinguishing between displacement and distance.  
determining average and instantaneous velocities, average and instantaneous accelerations.  
solving for unknown variables in the equations for motion in a straight line under constant acceleration.  
explaining the meaning of a freely falling object and solving the equation for free fall motion for any unknown quantity.

A student will demonstrate an understanding of Two-Dimensional Motion by:

explaining what is meant by projectile motion and calculating all quantities associated with projectile motion.  
explaining what is meant by relative velocity.

A student will demonstrate an understanding of the Laws of Motion by:

explaining what is meant by contact and field forces.  
identifying the applications of Newton's three laws of motion.  
explaining the difference between mass and inertia.  
utilizing Newton's second law of motion in calculations for any unknown quantity.  
explaining the similarity between weight and gravitational force.  
assessing the conditions for equilibrium to determine whether or not equilibrium exists.  
explaining the two types of friction and the conditions under which each exists.  
explaining how friction works and being able to calculate the quantity of force due to friction.  
utilizing friction in situations where accelerations occur to determine the motion of objects.

A student will demonstrate an understanding of Circular Motion and the Law of Gravity by:

solving for angular displacement, angular velocity and angular acceleration when given appropriate information.  
solving the equations of rotational motion for any unknown quantity.  
determining linear quantities from angular quantities when given appropriate information.

calculating centripetal acceleration and force and explaining how they are requirements for any object undergoing circular motion.

calculating total acceleration for any object undergoing centripetal and linear acceleration simultaneously.

explaining how other forces can provide the centripetal forces necessary for circular motion.

determining the gravitational force between any two objects of any mass and separation distance.

determining the gravitational potential energy of an object.

interpreting angular quantities in terms of vectors.

A student will demonstrate an understanding of Work and Energy by:

discussing the technical definitions of work and energy.

calculating work done in various situations.

explaining the concept of potential energy and kinetic energy.

explaining the work-kinetic energy theorem.

explaining the meaning of conservative and non-conservative forces.

utilizing the conservation of mechanical energy in problems to solve for any unknown quantity.

applying the concept of elastic potential energy to problems involving springs.

calculating power in any of the units used in class.

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

explaining the meaning of momentum and expressing it in the correct units.

demonstrating the ability to break momentum into its components.

applying the momentum-impulse equation and explaining its relation to Newton's second law.

applying conservation of momentum in collisions of two or more objects in two dimensions to solve for any unknown quantity.

explaining the three different types of collisions and stating what is conserved in each type.

A student will demonstrate an understanding of Rotational Equilibrium and Rotational Dynamics by:

calculating torque when given a force and the lever arm distance at which it is applied.

applying the second condition for equilibrium as it applies to torque and forces.

explaining the concept of center of gravity and calculating it for simple homogeneous, symmetric bodies.

explaining the concept of moment of inertia and calculating its value for objects of various shape and mass.

utilizing the relationship between net torque and angular acceleration to solve for any unknown quantity.

defining angular momentum and calculating it from the characteristics of a moving object.

explaining the concept of conservation of angular momentum and how the total angular momentum will stay the same until an outside torque changes its total value.

A student will demonstrate an understanding of Simple Harmonic Motion and Elasticity by:

applying Hooke's law to solve for any unknown quantity associated with a spring.

explaining what is meant by simple harmonic motion and recognizing all terms associated with simple harmonic motion.

determining acceleration and velocity for a particle undergoing simple harmonic motion.  
determining the elastic potential energy stored in a spring and using the elastic potential energy equation to solve for any unknown quantity.  
determining the total mechanical energy of a system involving a spring or a pendulum and applying conservation of energy to solve for any unknown quantity in either case.  
determining the frequency, amplitude and wavelength for a wave when given appropriate information.  
explaining what is meant by stress and strain, Young's modulus, shear modulus, bulk modulus and the stress-strain curve for a solid.

A student will demonstrate an understanding of Fluids by:

calculating the density of a material and the pressure under a fluid with the appropriate units.  
explaining the meaning of specific gravity.  
explaining the difference between the pressure measurements discussed in class.  
explaining Archimedes' principle in general and determining the weight of objects immersed in a fluid.  
explaining what is required for objects to sink, float or remain suspended in a fluid.  
applying the equation of continuity to solve for any unknown quantity.  
explaining Bernoulli's equation in terms of conservation of energy.  
applying Bernoulli's equation to solve for any unknown quantity.  
explaining the concepts of surface tension, capillary action and viscosity.  
explaining the concept of transport phenomena and diffusion.

A student will demonstrate an understanding of Thermal Physics by:

explaining the difference between temperature and thermal energy.  
solving conversion calculations among Celsius, Kelvin and Fahrenheit temperature scales.  
explaining what is meant by the triple point of water.  
explaining what is meant by absolute zero and expressing that quantity in all temperature scales.  
determining the amount of expansion, area change, or volume change undergone by solids and liquids through a temperature change.  
applying the equation of state for an ideal gas.  
defining the ideal gas law and using it to solve for any unknown quantity.  
defining the kinetic theory of gases.

A student will demonstrate an understanding of Heat by:

explaining the concept of heat as a quantity of energy and converting quantities of heat into quantities of energy.  
calculating the amount of heat energy required to change the temperature of a substance by a given number of degrees.  
explaining what is meant by specific heat.  
explaining what is meant by latent heat.  
explaining how heat is transferred by conduction, convection and thermal conductivity and calculating the amount of heat energy transferred in each case.

A student will demonstrate an understanding of the basic behavior of Sound Waves by:

explaining the difference between the different types of waves discussed in class.

categorizing a sound as infrasonic, audible or ultrasonic.  
calculating the speed of sound through a liquid or a solid rod.  
calculating the temperature dependent speed of sound through air.  
calculating the intensity of a sound wave when given the power produced and converting that intensity into a decibel level.  
calculating the intensity at a second distance when given a sound intensity at one distance  
applying the Doppler effect to determine the apparent frequency heard for a variety of moving sound sources or sound observers.

A student will demonstrate an understanding of the complex behavior of Sound Waves by:

determining the appearance of waves having undergone superpositioning or interference.  
explaining what is meant by constructive or destructive interference.  
calculating characteristics of standing waves (harmonics, overtones) such as frequency, wavelength or length.  
explaining the concepts of forced vibration and resonance.  
calculating the fundamental frequencies for standing waves in air column, closed pipes and open pipes.  
explaining the concept of beats in sound waves.  
explaining what is meant by the quality of sound.

***\*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](mailto: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).

<p><b>Inquiries regarding the non-discrimination policies:</b></p>	
<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>