HORRY GEORGETOWN TECHNICAL COLLEGE

INSTRUCTIONAL PACKAGE

PHY 222
University Physics II

Effective Term
Fall 2021

INSTRUCTIONAL PACKAGE

Part I: Course Information

Effective Term: 2021-2022

COURSE PREFIX: PHY 222 COURSE TITLE: University Physics II

CONTACT HOURS: 3-3 CREDIT HOURS: 4

RATIONALE FOR THE COURSE:
Completion of PHY 222 enables the student to gain an appreciation and working knowledge of fundamental principles in the area of physics and build on the concepts introduced in PHY 221. 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 course is a continuation of calculus-based treatment of the following topics: thermodynamics, kinetic theory of gases, electricity and magnetism, including electrostatics, dielectrics, electric circuits, magnetic fields, and induction phenomena. This course is transferable to public senior institutions as part of the South Carolina Higher Education Statewide Articulation Agreement.

PREREQUISITES/CO-REQUISITES:
Credit level PHY 221 Minimum Grade of C or Credit level PHY 221 Minimum Grade of TC

REQUIRED MATERIALS:
Please visit the BOOKSTORE online site for most current textbook information. Use the direct link to find textbooks.

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.
myHGTC and college 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 electric forces and electric fields by:

defining electric charge.
discussing the electric force between charged particles.
distinguishing between conductors and insulators.
explaining charging by contact and charging by induction.
applying Coulomb's law to calculate the force on a point charge due to other point charges.
determining the net electric field due to a configuration of point charges.
illustrating electric field lines.
explaining the electric field inside a conductor.
applying Gauss' law to obtain the value of the electric field due to charge distributions.

explaining how copiers and printers operate.

A student will demonstrate an understanding of electric potential energy and the electric potential by:

defining electrical potential energy.
solving problems involving electrical potential and electrical potential energy.
determining electric potential created by point charges.
relating equipotential surfaces to the electric field.
solving problems involving capacitors.
discussing biomedical applications of electric potential.

A student will demonstrate an understanding of electric circuits by:

defining electromotive force and current.
solving problems using Ohm's Law for a simple series circuit.
relating electrical resistance and resistivity.
solving problems involving electric power.
solving AC circuit problems for current and power.
analyzing circuits with resistors connected in series.
analyzing circuits with resistors connected in parallel.
analyzing circuits with resistors connected both in series and in parallel.
solving circuit problems which include internal resistances of batteries.
solving complex circuit problems by applying Kirchhoff's rules.
explaining the operation of voltmeters and ammeters.
analyzing circuits with capacitors connected both in series and in parallel.
analyzing RC circuits.
explaining why electrical grounding is important.

A student will demonstrate an understanding of magnetic forces and magnetic fields by:

defining magnetic field.
determining the magnetic force on a moving charge in a magnetic field.
analyzing the motion of a charged particle in a magnetic field.
summarizing how the masses of ions are determined using a mass spectrometer.
calculating the magnetic force on a current in a magnetic field.
calculating the torque on a current-carrying coil.
calculating magnetic fields produced by currents.
utilizing Ampere's law to calculate the magnetic field due to steady current.
explaining the phenomenon of ferromagnetism in magnetic materials.

A student will demonstrate an understanding of electromagnetic induction by:

explaining how an induced current is produced.
solving motional EMF problems.
calculating magnetic flux.
solving problems using Faraday's law of induction.
predicting the direction of an induced current using Lenz's Law.
discussing how sound is reproduced via induction.

solving problems involving generators.
defining mutual induction and self-inductance.
solving problems involving transformers.

A student will demonstrate an understanding of alternating current circuits by:

calculating capacitive reactance.
calculating inductive reactance.
calculating impedance in an RLC circuit.
calculating the resonance frequency of an LRC circuit.
discussing how semiconductor devices operate.

A student will demonstrate an understanding of electromagnetic waves by:

explaining how electromagnetic waves are produced and their important characteristics.
calculating the speed, frequency and wavelength of electromagnetic waves.
relating the speed of light to electromagnetic quantities.
calculating energy, power and intensity for electromagnetic waves.
solving problems involving the Doppler Effect for electromagnetic waves.
solving polarization problems using Malus' law.

A student will demonstrate an understanding of the reflection of light (mirrors) by:

relating wave fronts and rays.
applying the law of reflection to plane mirrors.
discussing image formation by a plane mirror.
calculating the focal length of a spherical mirror.
illustrating ray tracing for spherical mirrors.
utilizing the mirror and magnification equations to solve problems.

A student will demonstrate an understanding of the refraction of light (lenses and optical instruments) by:

defining the index of refraction.
applying Snell's law to solve refraction problems.
analyzing total internal reflection.
defining Brewster's angle.
analyzing examples involving dispersion of light.
analyzing how images are formed by converging and diverging lenses.
illustrating ray tracing for converging and diverging lenses.
utilizing the lens and magnification equations to solve problems.
solving problems involving lenses in combination.
applying ray tracing and the thin lens equation to solve problems involving the human eye.
calculating angular size and angular magnification.
applying optical principles to the compound microscope.
applying optical principles to the telescope.
discussing spherical and chromatic lens aberrations.

A student will demonstrate an understanding of interference and the wave nature of light by:

applying the principle of linear superposition to light waves.
analyzing double-slit interference.
analyzing thin-film interference.
explaining the operation of the Michelson interferometer.
analyzing single-slit diffraction.
determining the resolving power of lenses.
applying interference principles to the diffraction grating.
analyzing the role of interference in reading CDs and DVDs.
discussing x-ray diffraction in crystals.

A student will demonstrate an understanding of special relativity by:

defining inertial reference frames.
listing the postulates of special relativity.
utilizing time dilation to calculate time intervals in different frames of reference.
utilizing length contraction to calculate distances in different frames of reference.
determining the relativistic momentum of a high speed particle.
determining the value of the various forms of energy a moving body possesses.
determining the relative velocity between relativistically moving bodies.

A student will demonstrate an understanding of particles and waves by:

defining wave-particle duality.
explaining the origin of Planck's constant from blackbody radiation.
utilizing the photon's energy to explain in detail the photoelectric effect.
utilizing the photon's momentum to explain in detail the Compton Effect.
solving problems involving de Broglie wavelength of a particle.
calculating quantum uncertainty using the Heisenberg Uncertainty Principle.

A student will demonstrate an understanding of the nature of the atom by:

discussing the nuclear atom.
determining the wavelengths of hydrogen line spectra.
utilizing the Bohr model to predict the energy levels in hydrogen.
explaining Bohr's assumption regarding angular momentum.
applying quantum mechanics to electron energy levels in hydrogen.
utilizing the Pauli Exclusion Principle to explain the periodic table.
applying the Bohr model to x-ray production in atoms.
explaining how a laser operates.
summarizing laser applications in medicine.
explaining how holographic images are made and viewed.

A student will demonstrate an understanding of nuclear physics and radioactivity by:

identifying properties of the nucleus.
defining and discussing the strong nuclear force.
calculating nuclear binding energy and mass defect.

analyzing alpha, beta and gamma decays.
explaining the role of the neutrino in weak nuclear decay.
solving problems involving radioactive decay.
calculating age using radioactive dating.
analyzing radioactive decay series.
explaining how radiation detectors operate.

A student will demonstrate an understanding of ionizing radiation, nuclear energy, and elementary particles by:

calculating biological effects of ionizing radiation.
applying nuclear conservation laws to complete induced nuclear reactions.
calculating the energy released in nuclear fission reactions.
discussing the basic components of nuclear reactors.
calculating the energy released in nuclear fusion reactions.
discussing elementary particle theories leading to the Standard Model.
utilizing Hubble's law to explain the age and size of the universe.

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. 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 tutors** for most subject areas, **Writing Center support**, and **college success skills**.
2. Online **tutoring** and academic support resources.
3. Professional and interpersonal communication **coaching** in the EPIC Labs.

Visit the Student Success & Tutoring Center website for more information. To schedule tutoring, contact the SSTC at sstc@hgtc.edu or self-schedule in the Penji iOS/Android app or at www.penjiapp.com. Email sstc@hgtc.edu or 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.

STUDENT INFORMATION CENTER: TECH Central

TECH Central offers to all students the following free resources:

1. **Getting around HGTC**: General information and guidance for enrollment, financial aid, registration, and payment plan support!
2. Use the Online Resource Center (ORC) including Office 365 support, password resets, and username information.
3. **In-person workshops, online tutorials and more services** are available in Desire2Learn, Student Portal, Degree Works, and Office 365.
4. **Chat with our staff on TECH Talk**, our live chat service. TECH Talk can be accessed on the student portal and on TECH Central's website, or by texting questions to (843) 375-8552.

Visit the Tech Central website for more information. Live Chat and Center locations are posted on the website. Or please call (843) 349 – TECH (8324), Option #2.

STUDENT TESTING:

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 HGTC's Accessibility and Disability Service webpage. The Accessibility and Disability staff 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.

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).

INQUIRIES REGARDING THE NON-DISCRIMINATION/TITLE IX POLICIES:

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.

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
EEO and Title IX Coordinator
Building 200, Room 212A, Conway Campus
PO Box 261966, Conway, SC 29528-6066
843-349-5212
Jacquelyne.Snyder@hgtc.edu