HORRY GEORGETOWN TECHNICAL COLLEGE

INSTRUCTIONAL PACKAGE

PHY 202

Physics II

Fall 2018-Summer 2019

INSTRUCTIONAL PACKAGE

PART I: COURSE INFORMATION

Effective Term: 2018-2019

COURSE PREFIX: PHY 202 COURSE TITLE: Physics II

CONTACT HOURS: 3-3 CREDIT HOURS: 4

RATIONALE FOR THE COURSE:
Completion of PHY 202 enables the student to gain an appreciation and working knowledge of fundamental principles in the area of physics and builds on the concepts introduced in PHY 201. 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 course covers physics topics, including 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 PHY 201 Minimum Grade of C or Credit level PHY 201 Minimum Grade of TC.

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.

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

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

Lecture Student 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.

Lab Student Learning Outcomes:
Learning outcomes for the lab portion of this course are the Objectives given for each lab in the manual and can be found at the start of each lab. They include hands-on items such as identification and proper use of lab equipment, and various experimental techniques.

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.

DEPARTMENT OF NATURAL SCIENCES GRADING POLICY
Your grade for this course will be determined solely on the basis of the criteria outlined below. Students will not be allowed to substitute other activities (reports, homework, etc.) to count in place of any of the stated criteria (this means there will be NO extra credit offered). As the tests/exams given in this course are designed to measure the extent to which you have mastered course materials, students should not expect there to be any "curving" of grades.

EVALUATION*

Lecture	75%
Labs	25%
	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.

Withdrawal before the sixth day of the term is considered a "drop" and will not show on the official transcript. Withdrawal from the sixth day of the term through the two-thirds point of the term results in a grade of "W." Students who withdraw after the two-thirds point will receive either a grade of a "W" (if passing the course at the time of withdrawal), or the course instructor can assign a grade of "WF" (if the student is not passing the course at the time of withdrawal). Students should discuss their withdrawal plans and the grade they will receive with their instructor prior to withdrawal.

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 eighty percent (80%) of his or her classes in order to be eligible to receive credit for any course. However, due to the varied nature of courses taught at the College, a more rigid attendance policy may be required by individual instructors. At a minimum, a student may be withdrawn from a course(s) after he or she has been absent in excess of ten percent (10%) of the total contact hours for a course. **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 two (2). 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. Room locations and Live Chat is available on the SSTC website.

Student Information Center: WaveNet Central (WNC)

WNC offers to all students the following **free** resources:

1. **Getting around HGTC**: General information and guidance for enrollment!
2. Use the **Online Resource Center (ORC)** for COMPASS support, technology education, and online tools.
3. **Drop-in technology support or scheduled training** in the Center or in class.
4. **In-person workshops, online tutorials and more services** are available.

Visit the WNC website: Wavenet Central. Live Chat and Center locations are posted on the website. Or please call one of the following locations: WNC Conway, 349-5182; WNC Grand Strand, 477-2076; and WNC Georgetown, 520-1473.

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 Jocelyn Williams, 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, gender, national or ethnic origin, age, religion, disability, marital status, veteran status, sexual orientation, gender identity, or pregnancy in educational programs and/or activities.

Title IX Requirements

Horry Georgetown Technical College prohibits the offenses of domestic violence, dating violence, sexual assault, and stalking. Any student who believe he or she has experienced or witnessed discrimination including sexual harassment, domestic violence, dating violence, sexual assault or stalking is encouraged to report such incidents to one of the College's Title IX Coordinators.

> *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 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 Associate Vice President for Student Affairs.	Employee and applicant inquiries concerning Section 504, Title II, and Title IX and their application to the College may be directed to the Associate Vice President for Human Resources.
Dr. Melissa Batten, AVP 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	**Jacquelyne Snyder, AVP 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