HORRY GEORGETOWN TECHNICAL COLLEGE

INSTRUCTIONAL PACKAGE

AST 101

Solar System Astronomy

Fall 2018- Summer 2019

INSTRUCTIONAL PACKAGE

PART I: COURSE INFORMATION

Effective Term: 2018-2019

COURSE PREFIX: AST 101 COURSE TITLE: Solar System Astronomy

CONTACT HOURS: 3-3 CREDIT HOURS: 4

RATIONALE FOR THE COURSE:
AST 101 introduces scientific processes such as analysis of light spectra, planetary system formation, techniques for searching for extra-solar planets and summarizing scientific laws that govern these processes. By critically evaluating information presented, students prepare for scientific fields in which they will be expected to apply scientific principles in their careers.

COURSE DESCRIPTION:
This course is a descriptive survey of the universe with emphasis on basic physical concepts and the objects in the solar system. Related topics of current interest are included in the course.

PREREQUISITES/CO-REQUISITES:
(Credit level MAT 101 Minimum Grade of C or Credit level MAT 101 Minimum Grade of TC or Credit level MAT 102 Minimum Grade of C or Credit level MAT 102 Minimum Grade of TC or Credit level MAT 110 Minimum Grade of C or Credit level MAT 110 Minimum Grade of TC or Credit level MAT 120 Minimum Grade of C or Credit level MAT 120 Minimum Grade of TC or Credit level MAT 155 Minimum Grade of C or Credit level MAT 155 Minimum Grade of TC) or (ACCUPLACER Elementary Algebra 040 or New ACCUPLACER Arithmetic 220 or New ACCUPLACER Adv Algebra 200 or COMPANION Elementary Algebra 040 or COMPASS Algebra 20 or SAT Mathematics 400 or New SAT Mathematics 420 or ACT Math 15)
****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:
Mastering Astronomy access from Pearson is a required component of this course.
Voyager Program from Carina Software for the Lab component of the course.

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

Chapter 1: Charting the Heavens – The Foundations of Astronomy
Summarizing the basic levels of structure in the universe in order of increasing size.
Showing the difference between scientific theories, hypotheses, and observations.
Explaining the celestial sphere, and how astronomers use constellations and angular measurement to locate objects in the sky.
Summarizing how and why the Sun and the stars appear to change their positions from night to night and from month to month.
Explaining how Earth's axial tilt causes the seasons, and why the seasons change over time. Summarizing the changing appearance of the Moon, and explaining how the relative motions of Earth, the Sun and the Moon lead to eclipses.
Relating an example of how simple geometric reasoning can be used to measure the distances and sizes of otherwise inaccessible objects.

Chapter 2: The Copernican Revolution – The Birth of Modern Science

Relating how some ancient civilizations attempted to explain the heavens in terms of Earth-centered models of the universe.
Explaining how the observed motions of the planets led to our modern view of a Sun-centered solar system.
Summarizing the major contributions of Galileo and Kepler to our understanding of the solar system.
Stating Kepler's laws of planetary motion.
Explaining how astronomers have measured the true size of the solar system.
Stating Newton's laws of motion and universal gravitation and explaining how they account for Kepler's laws.
Explaining how the law of gravitation enables us to measure the masses of astronomical bodies.

Chapter 3: Radiation – Information from the Cosmos

Classifying the basic properties of wave motion.
Telling how electromagnetic radiation transfers energy and information through interstellar space.
Outlining the major regions of the electromagnetic spectrum and explaining how Earth's atmosphere affects our ability to make astronomical observations at different wavelengths.
Explaining what is meant by the term "blackbody radiation" and comparing the basic properties of such radiation.
Telling how we can determine the temperature of an object by observing the radiation that it emits.
Showing how the relative motion of a source of radiation and its observer can change the perceived wavelength of the radiation, and explain the importance of this phenomenon to astronomy.

Chapter 4: Spectroscopy – The Inner Workings of Atoms

Comparing the characteristics of continuous, emission, and absorption spectra and the conditions under which each is produced.
Explaining the relation between emission and absorption lines and what we can learn from those lines.
Outlining the basic components of the atom and interpreting our modern conception of its structure.
Discussing the observations that led scientists to conclude that light has particle as well as wave properties.
Explaining how electron transitions within atoms produce unique emission and absorption features in the spectra of those atoms.
Classifying the general features of spectra produced by molecules.
Listing and explaining the kinds of information that can be obtained by analyzing the spectra of astronomical objects.

Chapter 5: Telescopes – The Tools of Astronomy

Sketching how optical telescopes work, and examining the advantages of reflecting telescopes over refractors.
Explaining why larger telescopes gather more light and can make more detailed images.
Explaining the purpose of some of the detectors used in astronomical telescopes.
Outlining how Earth's atmosphere limits astronomical observations, and how astronomers overcome these limitations.
Discussing the relative advantages and disadvantages of radio and optical astronomy.
Explaining how interferometry is used to improve astronomical observations.
Explaining the design of infrared, ultraviolet, and high energy telescopes, and explaining why some telescopes must be placed in space.
Telling why it is important to make astronomical observations at many different wavelengths across the electromagnetic spectrum.

Chapter 6: The Solar System – An Introduction to Comparative Planetology

Discussing the importance of comparative planetology to solar system studies.
Interpreting the overall scale and structure of the solar system.
Summarizing the basic differences between the terrestrial and the jovian planets.
Identifying and comparing the major nonplanetary components of the solar system.
Outlining the theory of solar system formation that accounts for the overall properties of our planetary system.
Explaining how the terrestrial planets formed.
Discussing the leading theories for the formation of the jovian worlds.
Explaining how comets and asteroids formed, and explaining their role in determining planetary properties.

Chapter 7: Earth – Our Home in Space

Summarizing the physical properties of planet Earth.
Explaining how Earth's atmosphere helps to heat us, as well as protect us.
Outlining our current model of Earth's interior and explaining some of the experimental techniques used to establish the model.
Summarizing the evidence for the phenomenon of "continental drift" and discussing the physical process that drives it.
Discussing the nature and origin of Earth's magnetosphere.
Interpreting how both the Moon and the Sun influence Earth's surface and affect our planet's spin.

Chapter 8: The Moon and Mercury – Scorched and Battered Worlds

Specifying the general characteristics of the Moon and Mercury and comparing them with those of Earth.
Summarizing the surface features of the Moon and Mercury, and recounting how those two bodies were formed by events early in their history.
Explaining how the Moon's rotation is influenced by its orbit around Earth, and Mercury's by its orbit around the Sun.
Explaining how observations of cratering can be used to estimate the age of a body's surface.
Summarizing the evidence for ancient volcanism on the Moon and Mercury.
Comparing the Moon's interior structure with that of Mercury.
Summarizing the leading theory of the formation of the Moon.
Discussing how astronomers have pieced together the story of the Moon's evolution, and comparing its evolutionary history with that of Mercury.

Chapter 9: Venus – Earth's Sister Planet

Summarizing Venus's general orbital and physical properties.
Classifying the characteristics of Venus's atmosphere and contrasting it with that of Earth.
Comparing the large-scale surface features and geology of Venus with those of Earth and the Moon.
Discussing the evidence for ongoing volcanic activity on Venus.
Explaining why the greenhouse effect has produced conditions on Venus very different from those on Earth.
Outlining Venus's magnetic field and internal structure.

Chapter 10: Mars – A Near Miss for Life?

Summarizing the general orbital and physical properties of Mars.
Relating the observational evidence for seasonal changes on Mars.
Comparing the surface features and geology of Mars with those of the Moon and Earth, and accounting for these characteristics in terms of Martian history.
Discussing the evidence that Mars once had a much denser atmosphere and running water on its surface.
Explaining where that ancient water on Mars may be found today.

Comparing the atmosphere of Mars with those of Earth and Venus, and explaining why the evolutionary histories of these three worlds diverged so sharply.
Discussing what is known of the internal structure of Mars.
Interpreting the characteristics of the Martian moons and explaining their probable origin.

Chapter 11: Jupiter – Giant of the Solar System
Specifying the ways in which Jupiter differs from the terrestrial planets in its physical and orbital properties.
Discussing the processes responsible for the appearance of Jupiter's atmosphere.
Outlining Jupiter's internal structure and composition, and explaining how their properties are inferred from external measurements.
Summarizing the characteristics of Jupiter's magnetosphere.
Discussing the orbital properties of the Galilean moons of Jupiter, and summarizing the appearance and internal structure of each moon.
Explaining how tidal forces can produce enormous internal stresses in a jovian moon, and discussing some effects of those stresses.

Chapter 12: Saturn – Spectacular Rings and Mysterious Moons
Summarizing the orbital and physical properties of Saturn, and comparing them with those of Jupiter.
Outlining the composition and structure of Saturn's atmosphere and interior.
Explaining why Saturn's internal heat source and magnetosphere differ from those of Jupiter.
Comparing the structure and composition of Saturn's rings.
Defining the Roche limit, and explaining its relevance to the origin of Saturn's rings.
Summarizing the general characteristics of Titan, and discussing the chemical processes in its atmosphere.
Discussing some of the orbital and geological properties of Saturn's smaller moons.

Chapter 13: Uranus and Neptune – The Outer Worlds of the Solar System
Outlining how both chance and calculation played major roles in the discoveries of the outer planets.
Summarizing the similarities and differences between Uranus and Neptune, and comparing these planets with the other two jovian worlds.
Interpreting what is known about the interiors of Uranus and Neptune.
Explaining what the moons of the outer planets tell us about their past.
Contrasting the rings of Uranus and Neptune with those of Jupiter and Saturn.

Chapter 14: Solar System Debris – Keys to Our Origin
Outlining the orbital properties of the major groups of asteroids.
Summarizing the composition and physical properties of a typical asteroid.
Outlining the composition and structure of a typical comet, and explaining the formation and appearance of its tail.
Discussing the key characteristics of cometary orbits and what they tell us about the probable origin of comets.
Interpreting the solar system beyond Neptune, and explaining why astronomers no longer regard Pluto as a planet.
Distinguishing among the terms *meteor*, *meteoroid*, and *meteorite*.
Summarizing the orbital and physical properties of meteoroids, and explaining what these properties suggest about the probable origin of meteoroids.

Chapter 15: Exoplanets – Planetary Systems beyond Our Own
Explaining some regular and irregular aspects of the solar system, and explaining them in the context of the condensation theory.
Discussing some techniques astronomers use to detect planets beyond the solar system.
Summarizing the properties of known extrasolar planets and the categories of exoplanet not found in the solar system.
Discussing how extrasolar planets fit in with current theories of solar system formation.
Outlining the current observational evidence for habitable Earth-like planets beyond our solar system.

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.

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%
Lab 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 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.

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

Furthermore, 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