HORRY GEORGETOWN TECHNICAL COLLEGE

INSTRUCTIONAL PACKAGE

AST 102

Stellar Astronomy

Fall 2018- Summer 2019

INSTRUCTIONAL PACKAGE

PART I: COURSE INFORMATION

Effective Term: 2018-2019

COURSE PREFIX: AST 102 COURSE TITLE: Stellar Astronomy

CONTACT HOURS: 3-3 CREDIT HOURS: 4

RATIONALE FOR THE COURSE:
AST 102 includes a study of stars, star structures, galaxies and galaxy clusters. It allows students to complete an in-depth evaluation of scientific information presented, thus preparing them for future scientific careers.

COURSE DESCRIPTION:
This course is a descriptive survey of the universe with emphasis on basic physical concepts and galactic and extra- galactic objects. 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 16: The Sun
Summarizing the overall properties and internal structure of the Sun.
Demonstrating the concept of luminosity, and explaining how it is measured.
Explaining how studies of the solar surface tell us about the Sun's interior.
Listing and illustrating the outer layers of the Sun.
Discussing the nature and variability of the Sun's magnetic field.
Outlining the various types of solar activity and their relation to solar magnetism.
Outlining the process by which energy is produced in the Sun's interior.
Explaining how observations of the Sun's core changed our understanding of fundamental physics.

Chapter 17: The Stars
Explaining how stellar distances are determined.
Discussing the motions of the stars through space and how those motions are measured from Earth.
Distinguishing between luminosity and apparent brightness, and explain how stellar luminosity is determined.

Explaining the usefulness of classifying stars according to their colors, surface temperatures, and spectral characteristics.
Explaining how physical laws are used to estimate stellar sizes.
Explaining how a Hertzsprung–Russell diagram is constructed and used to identify stellar properties.
Explaining how knowledge of a star's spectroscopic properties can lead to an estimate of its distance.
Explaining how the masses of stars are measured and how mass is related to other stellar properties.

Chapter 18: The Interstellar Medium
Summarizing the composition and physical properties of the interstellar medium.
Outlining the characteristics of emission nebulae, and explaining their significance in the life cycle of stars.
Discussing the properties of dark interstellar clouds.
Specifying the radio techniques used to probe the nature of interstellar matter.
Discussing the nature and significance of interstellar molecules.

Chapter 19: Star Formation
Summarizing the sequence of events leading to the formation of a star like our Sun.
Explaining how the formation of a star depends on its mass.
Outlining some of the observational evidence supporting the modern theory of star formation.
Explaining the nature of interstellar shock waves, and discussing their possible role in the formation of stars.
Explaining why stars form in clusters, and distinguish between open and globular star clusters.

Chapter 20: Stellar Evolution
Explaining why stars evolve off the main sequence.
Outlining the events that occur as a Sun-like star evolves from the main sequence to the giant branch.
Explaining how the Sun will eventually come to fuse helium in its core, and describe what happens when that occurs.
Summarizing the stages in the death of a typical low-mass star, and interpreting the resulting remnant.
Contrasting the evolutionary histories of high-mass and low-mass stars.
Discussing the observations that help verify the theory of stellar evolution.
Explaining how the evolution of stars in binary systems may differ from that of isolated stars.

Chapter 21: Stellar Explosions
Explaining how white dwarfs in binary-star systems can become explosively active.
Summarizing the sequence of events leading to the violent death of a massive star.
Outlining the two types of supernovae, and explaining how each is produced.
Explaining the observational evidence for the occurrence of supernovae in our Galaxy.
Explaining the origin of elements heavier than helium, and discussing the significance of these elements for the study of stellar evolution.
Outlining how the universe continually recycles matter through stars and the interstellar medium.

Chapter 22: Neutron Stars and Black Holes
Interpreting the properties of neutron stars, and explaining how these strange objects are formed.
Explaining the nature and origin of pulsars, and accounting for their characteristic radiation.
Listing and explaining some of the observable properties of neutron-star binary systems.
Discussing the basic characteristics of gamma-ray bursts and some theoretical attempts to explain them.
Explaining how black holes are formed, and discussing their effects on matter and radiation in their vicinity.
Interpreting Einstein's theories of relativity, and discuss how they relate to neutron stars and black holes.
Relating the phenomena that occur near black holes to the warping of space around them.

Discussing the difficulties that arise in observing black holes, and explaining some of the ways in which the presence of a black hole might be detected.

Chapter 23: The Milky Way Galaxy

Illustrating the overall structure of the Milky Way galaxy, and specifying how the various regions differ from one another.
Explaining the importance of variable stars in determining the size and shape of our Galaxy.
Outlining the orbital paths of stars in different regions of the Galaxy, and explaining how these motions are accounted for by our understanding of how the Galaxy formed.
Discussing some possible explanations for the existence of the spiral arms observed in our own and many other galaxies.
Explaining what studies of Galactic rotation reveal about the size and mass of our Galaxy, and discussing the possible nature of dark matter.
Interpreting some of the phenomena observed at the center of our Galaxy.

Chapter 24: Galaxies

Summarizing the basic properties of normal galaxies.
Discussing the distance-measurement techniques that enable astronomers to map the universe beyond the Milky Way.
Illustrating how galaxies are observed to clump into clusters.
Stating Hubble's law and explaining how it is used to derive distances to the most remote objects in the observable universe.
Specifying the basic differences between active and normal galaxies.
Illustrating some important features of active galaxies.
Explaining what drives the central engine thought to power all active galaxies.

Chapter 25: Galaxies and Dark Matter

Outlining some of the methods used to determine the masses of distant galaxies.
Explaining why astronomers think that most of the matter in the universe is invisible.
Discussing some theories of how galaxies form and evolve.
Explaining the role of black holes and active galaxies in current theories of galactic evolution.
Summarizing what is known about the large-scale distribution of galaxies in the universe.
Explaining some techniques used by astronomers to probe the universe on very large scales.

Chapter 26: Cosmology

Stating the cosmological principle, and explaining both its significance and its observational underpinnings.
Explaining what observations of the dark night sky tell us about the age of the universe.
Outlining the Big Bang theory of the expanding universe.
Discussing the possible outcomes of the present cosmic expansion.
Explaining the relationship between the density of the universe and the overall geometry of space.
Saying why astronomers think the expansion of the universe is accelerating, and discussing the cause.
Explaining what dark energy implies for the composition and age of the universe.
Interpreting the cosmic microwave background radiation, and explaining its importance to the science of cosmology.

Chapter 27: The Early Universe
Outlining the characteristics of the universe immediately after its birth.
Explaining how matter emerged from the primeval fireball.
Illustrating how radiation and matter evolved as the universe expanded and cooled.
Explaining how and when the simplest nuclei formed.
Discussing the consequence of the formation of the first atoms.
Summarizing the horizon and flatness problems, and explaining how the theory of cosmic inflation solves them.
Comparing the formation of large-scale structure in the cosmos.
Explaining how studies of the microwave background allow astronomers to test and quantify their models of the universe.

Chapter 28: Life in the Universe
Summarizing the process of cosmic evolution as it is currently understood.
Evaluating the chances of finding life elsewhere in the solar system.
Summarizing the various probabilities used to estimate the number of advanced civilizations that might exist in the Galaxy.
Discussing some of the techniques we might use to search for extraterrestrials and to communicate with them.

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