



Star & Galaxies – PHYS 1303.001 F2F

Course Syllabus: Spring 2024

“Northeast Texas Community College exists to provide personal, dynamic learning experiences empowering students to succeed.”

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Office Hours	Monday	Tuesday	Wednesday	Thursday	Friday
	Online	Online	Online	Online	Online

This syllabus serves as the documentation for all course policies and requirements, assignments, and instructor/student responsibilities.

Information relative to the delivery of the content contained in this syllabus is subject to change. Should that happen, the student will be notified.

Course Description: This course focuses on the history, development, and modern use of astronomy. It covers solar, galactic, and universal aspects of astronomy including stellar evolution, black holes, and current cosmological concepts. Three hours college credit.

Prerequisite(s): TSI Complete Status

Student Learning Outcomes:

1303.1 Recognize scientific and quantitative methods and the differences between these approaches and other methods of inquiry used in modern astrophysics.

1303.2 Communicate observations and interpretations clearly through written communication.

1303.3 Use basic laws of astronomy to solve assigned tasks.

1303.4 Translate, interpret, and extrapolate scientific theory governing the formation and evolution of stars.

1303.5 Translate, interpret, and extrapolate scientific theory governing the formation and evolution of galaxies and the universe.

1303.6 Use simple astronomy laboratory techniques to collect, manipulate, analyze, and draw conclusions from data representing physical phenomenon while working individually and in teams.

Core Curriculum Purpose and Objectives:

Through the core curriculum, students will gain a foundation of knowledge of human cultures and the physical and natural world; develop principles of personal and social responsibility for living in a diverse world; and advance intellectual and practical skills that are essential for all learning.

Courses in the foundation area of mathematics focus on quantitative literacy in logic, patterns, and relationships. In addition, these courses involve the understanding of key mathematical concepts and the application of appropriate quantitative tools to everyday experience.

Program Student Learning Outcomes:

Critical Thinking Skills

CT.1 Students will demonstrate the ability to 1) analyze complex issues, 2) synthesize information, and 3) evaluate the logic, validity, and relevance of data.

Communication Skills

CS.1 Students will effectively develop, interpret and express ideas through written communication.

Empirical and Quantitative Skills

EQS.1 Students will manipulate numerical data or observable facts by organizing and converting relevant information into mathematical or empirical form

EQS.2 Students will analyze numerical data or observable facts by processing information with correct calculations, explicit notations, and appropriate technology.

EQS.3 Students will draw informed conclusions from numerical data or observable facts that are accurate, complete, and relevant to the investigation.

Teamwork

TW.2 Students will work with others to support and accomplish a shared goal.

Evaluation/Grading Policy:

We will be using *Pathways to Astronomy*, 6th Ed by Schneider and Arny. You will find a link in the class Blackboard that take you to the website where you will complete your assignments. Assignments hosted in McGraw-Hill (the publisher) will represent 40% of your course average. Participation in class discussions counts a total of 20% (absences or refusal to participate will result in losing points). There will be four tests: Chapter Test 1, Midterm (Chapters 15-22), Chapter Test 2, and a Final Exam (Chapters 23-30). Each test is worth 10% of your final grade. The letter grading system is:

A	(90% - 100%)
B	(80% - 89%)
C	(70% - 79%)
D	(60% - 69%)
F	(< 60%)

Tests / Exams:

Test 1: Scientific Processes and Technologies
Test 2: Anomalies of Space
Test 3: Star-Scale Astronomy
Test 4: Galaxy-Scale Astronomy
FINAL EXAM: Cumulative, covering all semester material.

Tests are two parts: The first part is a group writing assignment where you will work with others to critique an article reported on a scientific topic. The second part is an individual, multiple-choice test. Each part of the test counts as 50% of the total grade.

Required Instructional Materials:

Pathways to Astronomy, 6th Ed by Schneider and Arny

Publisher: McGraw-Hill **ISBN Number:** 9781260445107

Optional Instructional Materials: None

Minimum Technology Requirements: Computer Access/Internet Access, Scientific calculator

Required Computer Literacy Skills: You will need access to Blackboard and learn.simcur.com to complete all assignments and tests.

Course Structure and Overview:

Students will be responsible for completing the reading assignments listed in the syllabus schedule to perform well on the reading quizzes and exams. Discussion assignments are made to assist in critical thinking and connecting individual facts to make a more complete concept.

Communications: Email will be responded to within 24 hours IF SENT SUNDAY-THURSDAY. Any information that I send out will be done in class, via Blackboard, or via NTCC email. I will NOT email sensitive information to a non-NTCC address.

Institutional/Course Policy: Late work will not be accepted without prior approval by the instructor. Students and instructor are expected to treat each other with respect in all communication (email, phone call, and discussion board).

Alternate Operations During Campus Closure and/or Alternate Course Delivery Requirements

In the event of an emergency or announced campus closure due to a natural disaster or pandemic, it may be necessary for Northeast Texas Community College to move to altered operations. During this time, Northeast Texas Community College may opt to continue delivery of instruction through methods that include, but are not limited to, online through the Blackboard Learning Management System, online conferencing, email messaging, and/or an alternate schedule. It is the responsibility of the student to monitor NTCC's website (<http://www.ntcc.edu/>) for instructions about continuing courses remotely, Blackboard for each class for course-specific communication, and NTCC email for important general information.

Additionally, there may be instances where a course may not be able to be continued in the same delivery format as it originates (face-to-face, fully online, live remote, or hybrid). Should this be the case, every effort will be made to continue instruction in an alternative delivery format. Students will be informed of any changes of this nature through email messaging and/or the Blackboard course site.

NTCC Academic Honesty/Ethics Statement:

NTCC upholds the highest standards of academic integrity. The college expects all students to

engage in their academic pursuits in an honest manner that is beyond reproach using their intellect and resources designated as allowable by the course instructor. Students are responsible for addressing questions about allowable resources with the course instructor. Academic dishonesty such as cheating, plagiarism, and collusion is unacceptable and may result in disciplinary action. This course will follow the NTCC Academic Honesty and Academic Ethics policies stated in the Student Handbook. Refer to the student handbook for more information on these subjects.

Statement Regarding the Use of Artificial Intelligence (AI) Technology:

Absent a clear statement from a course instructor, use of or consultation with generative AI shall be treated analogously to assistance from another person (collusion). Generative AI is a subset of AI that utilizes machine learning models to create new, original content, such as images, text, or music, based on patterns and structures learned from existing data (Cornell, Center for Teaching Innovation). Unauthorized use of generative AI tools to complete an assignment or exam is not permitted. Students should acknowledge the use of generative AI and default to disclosing such assistance when in doubt. Individual course instructors may set their own policies regulating the use of generative AI tools in their courses, including allowing or disallowing some or all uses of such tools. Students who are unsure of policies regarding generative AI tools are encouraged to ask their instructors for clarification. **(Adapted from the Stanford University Office of Community Standards-- accessed August 31, 2023)**

ADA Statement:

It is the policy of NTCC to provide reasonable accommodations for qualified individuals who are students with disabilities. This College will adhere to all applicable federal, state, and local laws, regulations, and guidelines with respect to providing reasonable accommodations as required to afford equal educational opportunity. It is the student's responsibility to request accommodations. An appointment can be made with the Academic Advisor/Coordinator of Special Populations located in Student Services and can be reached at 903-434-8264. For more information and to obtain a copy of the Request for Accommodations, please refer to the special populations page on the NTCC website.

Family Educational Rights and Privacy Act (FERPA):

The Family Educational Rights and Privacy Act (FERPA) is a federal law that protects the privacy of student education records. The law applies to all schools that receive funds under an applicable program of the U.S. Department of Education. FERPA gives parents certain rights with respect to their children's educational records. These rights transfer to the student when he or she attends a school beyond the high school level. Students to whom the rights have transferred are considered "eligible students." In essence, a parent has no legal right to obtain information concerning the child's college records without the written consent of the student. In compliance with FERPA, information classified as "directory information" may be released to the general public without the written consent of the student unless the student makes a request in writing. Directory information is defined as: the student's name, permanent address and/or local address, telephone listing, dates of attendance, most recent previous education institution attended, other information including major, field of study, degrees, awards received, and participation in officially recognized activities/sports.

Eagle Assist

Class is not the only aspect of a student's life. While the instructor may not be equipped to help with every issue that can arise outside of class, Northeast Texas Community College has an assistance coordination website call "Eagle Assist". You can find it online at www.ntcc.edu/eagleassist

Examples of Eagle Assist Help:

- Tutoring Rooms HUM 110 (Writing) and MS 112 (Math/Science) and online
- Classroom accommodations (ADHD, Dyslexia, etc.)
- Emergency Aid (financial, immediate needs)
- CARE center (student-led student help, non-financial)
- Counseling and Mental Wellness

Topics and Units Covered

- **Test 1: Scientific Processes and Technologies**
 - Fundamental Astronomy
 - Unit 2 – Beyond the Solar System
 - Unit 3 – Astronomical Numbers
 - Unit 4 – Scientific Foundations of Astronomy
 - Unit 5 – The Night Sky (Extra Credit)
 - Unit 13 – Observing the Sky (Extra Credit)
 - Necessary Physics
 - Unit 14 – Astronomical Motion: Inertia, Mass, and Force
 - Unit 15 – Force, Acceleration, and Interaction
 - Unit 16 – The Universal Law of Gravity
 - Unit 17 – Measuring a Body’s Mass Using Orbital Motion
 - Unit 20 – Conservation Laws (Extra Credit)
 - Unit 21 – The Dual Nature of Light and Matter (Extra Credit)
 - Unit 22 – The Electromagnetic Spectrum
 - Unit 23 – Thermal Radiation
 - Unit 24 – Identifying Atoms by Their Spectra
 - Unit 25 – The Doppler Shift
- **Test 2: Anomalies of Space**
 - Astronomy Physics
 - Unit 26 – Special Relativity
 - Unit 27 – General Relativity
 - Unit 28 – Detecting Light
 - Unit 29 – Collecting Light
 - Unit 30 – Focusing Light
 - Astronomy Observations
 - Unit 31 – Telescope Resolution
 - Unit 32 – Earth’s Atmosphere and Space Observatories (Extra Credit)
 - Unit 33 – Amateur Astronomy
 - Unit 54 – Surveying the Stars
 - Unit 55 – The Luminosities of Stars
 - The Sun
 - Unit 51 – The Sun, Our Star
 - Unit 52 – The Sun’s Source of Power
 - Unit 53 – Solar Activity
- **Test 3: Star-Scaled Astronomy**
 - Star Measurements
 - Unit 56 – The Temperatures and Compositions of Stars
 - Unit 57 – The Masses of Orbiting Stars
 - Unit 58 – The Sizes of Stars
 - Unit 59 – The H-R Diagram
 - Star ‘Life’
 - Unit 60 – Overview of Stellar Evolution
 - Unit 61 – Star Formation
 - Unit 62 – Main-Sequence Stars
 - Unit 63 – Giant Stars
 - Unit 64 – Variable Stars
 - Unit 65 – Mass Loss and Death of Low-Mass Stars
 - Unit 66 – Exploding White Dwarfs
 - Unit 67 – Old Age and Death of Massive Stars

- Unit 68 – Neutron Stars
- Unit 69 – Black Holes
- Unit 70 – Star Clusters
- **Test 4: Galaxy-scale Astronomy**
 - Milky Way
 - Unit 71 – Discovering the Milky Way
 - Unit 72 – Stars of the Milky Way
 - Unit 73 – Gas and Dust in the Milky Way
 - Unit 74 – Mass and Motions in the Milky Way
 - Other Galaxies
 - Unit 75 – A Universe of Galaxies
 - Unit 76 – Types of Galaxies
 - Unit 77 – Galaxy Clustering
 - Unit 78 – Active Galactic Nuclei
 - Cosmology
 - Unit 79 – Dark Matter
 - Unit 80 – Cosmology
 - Unit 81 – The Edges of the Universe
 - Unit 82 – The Curvature and Expansion of Universes
 - Unit 83 – The Beginnings of the Universe
 - Unit 84 – Dark Energy and the Fate of the Universe
 - Aliens
 - Unit 85 – Astrobiology
 - Unit 86 – The Search for Life Elsewhere

Tentative Course Timeline (*note* instructor reserves the right to adjust this timeline at any point in the term):

The course is effectively divided into three major segments: Scientific Processes and Technologies, Star-scaled Astronomy, and Galaxy-scaled astronomy.

Timing	Reading	Discussion	Assignments
Week 1	Units 2-5	<ul style="list-style-type: none"> • Course Procedures • Astronomy Basics 	<ul style="list-style-type: none"> • Assignment 1 – Introduction to Astronomy
Week 2	Units 14-15, 16-20	<ul style="list-style-type: none"> • Inertia, Mass, and Force • Gravity, Orbit, and Energy Conservation 	<ul style="list-style-type: none"> • Assignment 2 – Fundamental Physics • Assignment 3 – Basic Astronomy Physics
Week 3	Units 16-20, Units 21-25	<ul style="list-style-type: none"> • Gravity, Orbit, and Energy Conservation • The Science of Light 	<ul style="list-style-type: none"> • Assignment 4 – The Science of Light
Week 4	Units 21-25, Units 26-27	<ul style="list-style-type: none"> • The Science of Light • Relativity 	<ul style="list-style-type: none"> • Assignment 5 – Thermal Radiation • Assignment 6 – Relativity • Test 1
Week 5	Units 28-31	<ul style="list-style-type: none"> • Using Light in Astronomy 	<ul style="list-style-type: none"> • Assignment 7 – Using Light in Astronomy
Week 6	Units 32-33, 54-55	<ul style="list-style-type: none"> • Taking Star Measurements 	<ul style="list-style-type: none"> • Assignment 8 – Taking Star Measurements
Week 7	Units 51-53	<ul style="list-style-type: none"> • The Sun 	<ul style="list-style-type: none"> • Assignment 9 – The Sun • Assignment 10 – The Sun’s Activity • Test 2
Week 8	Units 56-61	<ul style="list-style-type: none"> • Stellar Formation • 	<ul style="list-style-type: none"> • Assignment 11 – Stellar Formation
Week 9	Units 62-64	<ul style="list-style-type: none"> • Stellar Evolution (life) • 	<ul style="list-style-type: none"> • Assignment 12 – Main Sequence and Low Mass Stars

Week 10	Units 65-70	<ul style="list-style-type: none"> • Stellar Death 	<ul style="list-style-type: none"> • Assignment 13 – Stellar Explosions and High Mass Stars • Test 3
Week 11	Units 71-74	<ul style="list-style-type: none"> • The Milky Way 	<ul style="list-style-type: none"> • Assignment 14 – The Milky Way
Week 12	Units 75-78	<ul style="list-style-type: none"> • Other Galaxies 	<ul style="list-style-type: none"> • Assignment 15 – Other Galaxies
Week 13	Units 79-81	<ul style="list-style-type: none"> • Cosmology 	<ul style="list-style-type: none"> • Assignment 16 – The Universe
Week 14	Units 82-84	<ul style="list-style-type: none"> • Cosmology (cont.) 	<ul style="list-style-type: none"> • Assignment 17 – Expansion of the Universe
Week 15	Units 85-86	<ul style="list-style-type: none"> • Exobiology 	<ul style="list-style-type: none"> • Test 4
Week 16	Final Exam May 9 @ 9:30 AM		