



Star & Galaxies – PHYS 1303.882 Online

Course Syllabus: Summer II 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 will 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 Blackboard discussions count a total of 20%. There will be four tests during the semester and one final exam. 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: Introduction to Stars and Galaxies

Test 2: Stars

Test 3: Star Formation

Test 4: Galaxy-Scale Astronomy

FINAL EXAM: Cumulative, covering all semester material.

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 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 homework, quizzes, and exams. Discussion assignments are made to assist in critical thinking and connecting individual facts to make a more complete concept.

Use of Proctorio:

To ensure all students are graded fairly and no one has the unfair advantage of cheating on quizzes and tests, Proctorio will be used. The browser add-on makes use of the webcam to flag any suspicious activity and report it to the instructor. You have the option to take the test at a proctored location. If you live near NTCC, you are welcome to use the Student Services Testing Center free of charge. You may use a testing center near your location, but you must handle the arrangements for the testing center and forward the necessary contact to the instructor for approval. If in-person proctoring is used, the instructor must approve of the proctoring a minimum of one week before the proctored test. Failure to arrange alternative proctoring early enough will result in Proctorio being required for the test.

Communications: Blackboard Course Messages are the only recognized method of communication. Messages will be responded to within 24 hours IF SENT SUNDAY-THURSDAY. Any information that I send out will be done via Blackboard. I will NOT email sensitive information to a non-NTCC address.

Institutional/Course Policy: Due to the short timeline of the course, late work will be accepted or denied on a case by case basis. Quizzes and Tests will not be accepted late 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.

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)**

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.

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: Introduction to Stars and Galaxies**
 - 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)
 - Stars
 - 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 56 – The Temperatures and Compositions of Stars
 - Unit 59 – The H-R Diagram
 - Milky Way
 - Unit 14 – Astronomical Motion: Inertia, Mass, and Force
 - Unit 15 – Force, Acceleration, and Interaction
 - Unit 16 – The Universal Law of Gravity
 - 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
- **Test 2: What We Know About Stars**
 - The Sun
 - Unit 51 – The Sun, Our Star
 - Unit 52 – The Sun’s Source of Power
 - Unit 53 – Solar Activity
 - Astronomy Physics
 - Unit 28 – Detecting Light (Extra Credit)
 - Unit 29 – Collecting Light (Extra Credit)
 - Unit 58 – The Sizes of Stars
 - Unit 57 – The Masses of Orbiting Stars
 - Unit 30 – Focusing Light (Extra Credit)
 - Astronomy Observations
 - Unit 31 – Telescope Resolution (Extra Credit)
 - 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
 - Necessary Physics
 - Unit 17 – Measuring a Body’s Mass Using Orbital Motion
 - Unit 25 – The Doppler Shift
- **Test 3: Star Formation Theory**
 - Star ‘Life’
 - Unit 20 – Conservation Laws (Extra Credit)
 - 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**
 - Other Galaxies
 - Unit 26 – Special Relativity
 - Unit 27 – General Relativity
 - 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 2-4, 22-24, 56, 59, 14-16, 71-74	<ul style="list-style-type: none"> • Introductions • The Birth of Stars and the Discovery of Planets Outside the Solar System 	<ul style="list-style-type: none"> • <u>Fundamental Astronomy</u> <ul style="list-style-type: none"> ○ 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) • <u>Stars</u> <ul style="list-style-type: none"> ○ 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 ○

<p>Week 2</p>	<p>Units 78-86, 51-53, 14-15, 16-20</p>	<ul style="list-style-type: none"> • The Sun 	<ul style="list-style-type: none"> ○ Unit 56 – The Temperatures and Compositions of Stars ○ Unit 59 – The H-R Diagram • <u>Milky Way</u> <ul style="list-style-type: none"> ○ Unit 14 – Astronomical Motion: Inertia, Mass, and Force ○ Unit 15 – Force, Acceleration, and Interaction ○ Unit 16 – The Universal Law of Gravity ○ Unit 71 – Discovering the Milky Way ○ Unit 72 – Stars of the Milky Way ○ Unit 73 – Gas and Dust in the Milky Way ○
<p>Week 3</p>	<p>Units 20, 60-70</p>	<ul style="list-style-type: none"> • A Stellar Census 	<ul style="list-style-type: none"> • Unit 74 – Mass and Motions in the Milky Way • Test 1 • <u>The Sun</u> <ul style="list-style-type: none"> ○ Unit 51 – The Sun, Our Star ○ Unit 52 – The Sun’s Source of Power ○ Unit 53 – Solar Activity • • <u>Astronomy Physics</u> <ul style="list-style-type: none"> ○ Unit 28 – Detecting Light (Extra Credit) ○ Unit 29 – Collecting Light (Extra Credit) ○ Unit 58 – The Sizes of Stars ○ Unit 57 – The Masses of Orbiting Stars ○ Unit 30 – Focusing Light (Extra Credit) • <u>Astronomy Observations</u> <ul style="list-style-type: none"> ○ Unit 31 – Telescope Resolution (Extra Credit) ○ Unit 32 – Earth’s Atmosphere and Space Observatories (Extra Credit)

<p>Week 4</p>	<p>Units 26-27, 75-86</p>	<ul style="list-style-type: none"> • TBA 	<ul style="list-style-type: none"> ○ Unit 33 – Amateur Astronomy ○ Unit 54 – Surveying the Stars ○ Unit 55 – The Luminosities of Stars • <u>Necessary Physics</u> <ul style="list-style-type: none"> ○ Unit 17 – Measuring a Body’s Mass Using Orbital Motion • Unit 25 – The Doppler Shift • Test 2 • <u>Star ‘Life’</u> <ul style="list-style-type: none"> ○ Unit 20 – Conservation Laws (Extra Credit) ○ Unit 60 – Overview of Stellar Evolution ○ Unit 61 – Star Formation ○
<p>Week 5</p>		<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> ○ 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
<p>Week 6</p>		<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> ○ Unit 69 – Black Holes • Unit 70 – Star Clusters • Test 3 • <u>Other Galaxies</u> <ul style="list-style-type: none"> ○ Unit 26 – Special Relativity ○ Unit 27 – General Relativity ○ Unit 75 – A Universe of Galaxies ○ Unit 76 – Types of Galaxies ○ Unit 77 – Galaxy Clustering ○ Unit 78 – Active Galactic Nuclei

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Week 7		•	<ul style="list-style-type: none"> • <u>Cosmology</u> <ul style="list-style-type: none"> ○ 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 • <u>Aliens</u> <ul style="list-style-type: none"> ○ Unit 85 – Astrobiology • Unit 86 – The Search for Life Elsewhere
Week 8	Extra Credit, Final Exam	• TBA	<ul style="list-style-type: none"> • Test 4 (Saturday – Tuesday) • Final Exam • Extra Credit will close this week