



Solar System – PHYS 1304.001 F2F

Course Syllabus: Spring 2021

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

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Office	Monday	Tuesday	Wednesday	Thursday	Friday	Online
Hours	4:30 – 5:30	9:30 – 11 4:30 – 5:30	4:30 – 5:30	9:30 – 11 1:30 – 5:30	N/A	N/A

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 is the study of the sun and other bodies in our solar system, including the origin of our solar system. Three hours college credit.

Prerequisite(s): TSI Complete Status

Student Learning Outcomes:

1304.1 Recognize scientific and quantitative methods and the differences between these approaches and other methods of inquiry used in modern astrophysics.

1304.2 Communicate observations and interpretations clearly through written communication.

1304.3 Use basic laws of astronomy to solve assigned tasks.

1304.4 Translate, interpret, and extrapolate scientific theory governing the formation and evolution of solar system.

1304.5 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:

Quizzes will represent 20% of your grade and class participation will count another 20%. There will be 3 tests and a Final Exam, as well as a group research paper (that will count as a test grade). The average of all tests will represent 60% of your grade. The letter grading system is:

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

Tests / Exams:

TEST 1: Chapters 1-4

TEST 2: Chapters 5-8

TEST 3: Chapters 9-12

FINAL EXAM: Chapters 1-12

Required Instructional Materials:

Kay, Palen, and Blumenthal. *21st Century Astronomy: The Solar System*, 6th Ed. W.W. Norton & Company, New York, 2019.

Publisher: W.W. Norton & Company

ISBN Number: 978-0-393-67552-8

Optional Instructional Materials: None

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

Required Computer Literacy Skills: You will need access to a word processor for the research assignment and to access Blackboard for additional work.

Course Structure and Overview:

Students will be responsible for completing the reading assignments listed in the syllabus schedule in order to participate in discussions and activities in the face-to-face portion of class. In class we will focus on topics that will be tested. Activities work to aid in comprehension and to strengthen scientific thought-processes.

Given the semi-online nature of this course, those watching remotely will be supplied with materials to participate in the face-to-face discussions and activities. There will be the occasional activity that is not immediately available to do remotely, in which case I will transfer the Zoom to my phone so that everyone can participate. If you are accessing the lecture remotely, your 'group' work will be using Zoom breakout rooms to facilitate small group discussion.

Communications: Email will be responded to within 24 hours IF SENT SUNDAY-THURSDAY. Due to the lack of internet availability at my home, I cannot guarantee responses over the weekend, though I will do my best. You can also call my office during office hours if you need to speak with me but can't make it to campus. However, I prefer face-to-face discussions, especially if you have a question about a homework problem. 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 and out of the classroom. Prompt attendance is expected for all class meetings. Missing lecture means missing discussion and important notes. During lecture, students are expected to be attentive to the topic discussed. Students found being consistently inattentive will be asked to leave.

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.

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.

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

Timing	Topic	Individual Learning	Group Learning (F2F Class)
Week 1	Introduction Notes: Introduction to Astronomy	Chapter 1 (entire chapter), Key Words: light-year, hypothesis, theory, falsified, cosmological principle, Occam's razor	Scale of the Solar System (outside), Identify the Science, Extra: <i>Voices of a Distant Star</i>
Week 2	The Position and Motion of Earth and Moon	Chapter 2 (entire chapter), Key Words: frame of reference, relative motion, Coriolis effect, summer solstice, winter solstice, autumnal equinox, vernal equinox, Arctic Circle, Tropic of Cancer, Equator, Tropic of Capricorn, Antarctic Circle, phases of the Moon, sidereal period, synodic period, solar eclipse, lunar eclipse	Video: Toilet Swirl (Veritasium and SmarterEveryDay), Phases of the Moon, Solar Eclipses
Week 3	The Motion of Astronomical Bodies	Chapter 3 (entire chapter), Key Words: prograde motion, retrograde motion, heliocentric model, empirical science, Kepler's laws, Newton's laws,	Discussion: Retrograde motion of Venus and Mars, Discussion: Arguing for the Geocentric Model
Week 4	Gravity and Orbits	Chapter 4 (entire chapter), Key Words: gravity, weight, Newton's Law of Gravitation, orbit, centripetal force, circular velocity, escape velocity, tidal forces, tidal bulge, lunar tides, solar tides, spring tides, neap tides, tidal locking,	Video: "What Physics Teachers Get Wrong About Tides!" (PBSSpaceTime)
Week 5	Exam 1: Group Test and Individual Test		

<p>Week 6</p>	<p>Light – Taking Measurements from Afar</p>	<p>Chapter 5 (entire chapter), Key Words: wavelength, frequency, hertz (Hz), spectrum, nanometer, light spectrum, photon, nucleus, proton, neutron, electron, element, isotope, molecule, Bohr model, ground state, excited state, emission, absorption, Doppler effect, rest wavelength, blueshifted, redshifted, radial velocity, thermal equilibrium, temperature, kelvin (K), luminosity, Stefan-Boltzmann law, Wien’s Law, brightness</p>	<p>Activity: analyzing emission spectra</p>
<p>Week 7</p>	<p>The Tools of the Astronomer</p>	<p>Chapter 6 (entire chapter), Key Words: refracting telescope, reflecting telescope, aperture, objective lens, focal plane, focal length, eyepiece, chromatic aberration, diffraction limit, integration time, quantum efficiency, charge-coupled device (CCD), pixel, spectroscopy, atmospheric windows, interferometric array, flyby (probe), orbiter, lander, rover, atmospheric probe, neutrino, gravitational wave</p>	

Week 8	The Formation of Planetary Systems	Chapter 7 (entire chapter), Key Words: nebular hypothesis, nebula, meteorites, protostar, protoplanetary disk, accretion disk, planetesimals, gravitational potential energy, kinetic energy, refractory materials, volatile materials, primary atmosphere, secondary atmosphere, comet, terrestrial planets, giant planets, moon, giant planet, comet nucleus/nuclei, exoplanet, planet detection methods	Activity: Analyze images of protoplanetary disks
Week 9	The Terrestrial Planets and Earth's Moon	Chapter 8 (entire chapter), Key Idea: impact crater, comparative planetology, ejecta, secondary craters, meteor, meteoroid, meteorite, radioisotope, parent element, daughter element, half-life, seismic wave, primary (P) wave, secondary (S) wave, differentiation, magnetosphere, plate tectonics, volcanism, erosion	
Week 10	Exam 2: Group Test and Individual Test		
Week 11	Atmospheres of the Terrestrial Planets	Chapter 9 (entire chapter), Key Words: greenhouse effect, magnetosphere, aurora, Hadley circulation, paleoclimatology	Discussion: 'Global warming: real or not?'
Week 12	The Giant Planets	Chapter 10 (entire chapter), Key Words: stellar occultation, gas giant, ice giant, flux tube	

Week 13	Planetary Moons and Rings	Sections 11.1-11.3, Key Words: regular moon, irregular moon, Io, Europa, Titan, Triton, Ganymede, Mimas, Callisto, shepherd moons, composition of ring material	
Week 14	Planetesimals	Chapter 12 (entire chapter), Key Words: Kuiper Belt, Pluto, Ceres, asteroid belt, Trojan, Apollo, Aten, Amor, C-type, S-Type, M-type, active comet, Oort Cloud, short-period comet, long-period comet, head, coma, tail, ion tail, dust tail, chondrule	Lecture
Week 15	Exam 3: Group Test and Individual Test		
Week 16	Final Exam (Dec 11 @ 6 pm)	The final exam will be in two parts (on the same day) a group part and an individual part. The format will follow normal testing format.	