



PHY 105 Physical Science by Inquiry

Alexa Azure

UNITED TRIBES TECHNICAL COLLEGE

COURSE INFORMATION

This course is an in-depth inquiry based exploration of basic principles of physical science and scientific methods that are often taught in elementary school. The focus will be on properties of matter, light and color, electric circuits, kinematics, and astronomy. This course is intended for non-science majors.

Credits: 3

Pre/Corequisites:

- Prerequisite: MTH 101
- Corequisite: LAB 105

CLASS INFORMATION

Section Number: A

Term: Spring Year: 2022 Start Date: 1/10/2022 End Date: 5/13/2022

Meeting Times: Monday and Wednesday from 10:30 am to 11:50 am

Meeting Location: Science and Tech, room 232

Delivery Mode: Face to Face

INSTRUCTOR

Alexa Azure

Email: aazure@uttc.edu

Office Phone: 701-221-1395

Office Location: SCITC 205-A

Office Hours: See schedule in my.uttc.edu under the main page information



Time	Monday	Tuesday	Wednesday	Thursday	Friday
8:30 – 9:00					
9:00 – 9:50			ASPIRE Meetings		Office Hours
10:00 – 10:30	Office Hours	Office Hours		Office Hours	LAB 105 A Physical
10:30 – 10:50	PHY 105 A Physical Sc.	MTH 102 B Intermediate	PHY 105 A Physical Sc.	MTH 102 B Intermediate	Science by Inquiry
11:00 – 11:50	By Inquiry SCITC 232	Algebra SCITC 232	By Inquiry SCITC 232	Algebra SCITC 232	SCITC 217
12:00 – 12:50	Office Hours	Office Hours	AISES Meeting	Office Hours	AIHEC AM Meetings
1:00 – 1:50	Office Hours	ENR 201 A Statics	Statics Tutor Office Hours	ENR 201 A Statics	Office Hours
2:00 – 2:30	Office Hours	SCITC 202 & Zoom	Room 202 & Zoom	SCITC 202 & Zoom	Office Hours
2:30 – 2:50					
2:30-3:00					
3:00 – 3:30					
3:30 – 3:50				All Hands Academic	ND TCU Engineering
4:00 – 4:30		Engineering Advisory		Council ENR Dept.	Group Meetings
4:30 – 5:00		Council Meetings		Meeting	

TEXTBOOKS

Hewitt, P.G., (2016). *Conceptual Physical Science*. (6th ed.) Pearson Publishing.

Hewitt, P.G., (2016). *Practice Book for Conceptual Physical Science*. (6th ed.). Pearson Publishing

INSTITUTIONAL LEARNER OUTCOMES

Critical Thinking: Employ critical thinking skills in the processes used to identify and solve problems.

Quantitative & Scientific Reasoning: Develop solutions to mathematical and scientific problems.

COURSE OBJECTIVES

1. Explain various physical science concepts and principles.
2. Apply the various physical science concepts to practical experiences.

3. Summarize the scientific method and its applications.
4. Analyze problems related to simple motion, heat, temperature, energy, sound, and light.
5. Explain the origin, structure and motions of the solar system, galaxy and universe.

A. GRADING SCALE

Grade	Percentage
A	90-100%
B	80-89%
C	70-79%
D	60-69%
F	Below 60%

B. COMMUNICATION

Email is the official means of communication at UTTC. Information Technology (IT) will assign all students an official UTTC email address. All correspondence from the College to the student will be sent to the student's UTTC email address. Students are expected to check their email regularly and are responsible for all information sent to them via their UTTC email address. Faculty expect students to use their official email address for all instructional purposes, including communicating with the faculty.

C. ATTENDANCE

Students at UTTC are expected to participate in all of their class sessions and are expected to communicate with their instructors regarding any emergencies that cause them to miss class. Regardless of the circumstances, the student is responsible for obtaining any information missed because of the absence and completing any outstanding assignments. The student may refer to the course assignments in My.UTTC.edu, contact another student enrolled in the course, or meet with the course instructor during office hours to get the missing information. Attendance is entered as "Present", "Absent-Unexcused", or "Excused" (college-sanctioned absences).

ZOOM Attendance Policy

UTTC students are expected to attend all of their classes in person. Students can attend a class virtually using Zoom only if the student is sick and unable to attend class or quarantined due to a contagious illness (confirmed by a medical professional) but on a limited basis. If the student is going to use Zoom under these circumstances, the following conditions must apply:

1. The student must have a computer and a reliable internet connection (phones are not allowable).

2. The computer must have a working microphone and camera and the camera must be turned on.
3. The student's face must be present in full frame. No background noise is allowed as this is distracting to the students in the classroom.
4. The student is responsible for contacting the instructor prior to class starting if they are sick or quarantined and need to use the Zoom option. This must be done with enough notice so the student using Zoom is ready for class when class starts.
5. If these conditions cannot be met, the student will be marked absent from class for the class period(s) missed.

*The only exception to not physically being in class is for students who are registered for online courses that are designated by OL (e.g. CSC 101 OL, PSY 111 OL, ENG 120 OL).

***Some courses are not available through Zoom, such as Tribal Arts, Heavy Equipment, Welding Technology, and others. Students in these classes must be physically present or will be counted absent.*

D. LATE ASSIGNMENT SUBMISSIONS

UTTC supports and fosters the student's responsibility for completing and submitting assignments on or before scheduled due dates and times. If an assignment is due, the student should make every effort to submit the assignment on time. Occasionally, a student may experience an unexpected life event that results in the submission of late work. Communication is the key. Instructors are more than willing to work with students in the event of an emergency if the student communicates with them before the date and time the assignment is due to make other arrangements.

Late assignment deadlines will vary among departments but will not exceed more than five (5) business days after which the assignment was initially due. Assignment due dates, late assignment deadlines, and late assignment penalties are outlined in course syllabi. Assignments not submitted by the initial deadline date will be reflected in the course gradebook as a zero (0) until the assignment has been submitted. The amount of points deducted for late work is at the discretion of the instructor. Assignments submitted via E-mail will not be accepted under any circumstances and will receive a grade of zero.

E. MISSED TEST, EXAMS AND QUIZZES (FORMAL ASSESSMENTS)

Students may not make up a missed test, exam or quiz without a valid reason for their absence (illness, family emergency). It is the student's responsibility to contact their instructors before the absence, or within 24 hours after missing the formal assessment. The instructor will review the reason the student missed and determine if the circumstance justifies the student being allowed to take the formal assessment. Approved make-up assessments must be taken outside of the student's regular class schedule and during a time and location agreed upon between the student and instructor. Students are not to miss another class in order to make-up an assessment for another course. If the student fails to show on the date and time of the makeup assessment, the student will not be permitted to reschedule the makeup and the assessment and will earn a 0% grade.

F. EARLY ALERT SYSTEM

UTTC's Early Alert System (EAS) is a proactive, communication driven support system that provides timely identification and interventions to work with individual students to assist in generating plans to overcome challenges to college success. The system assists UTTC students by linking them to faculty and staff who can provide and connect students to

available resources and strategies. The early alert serves as an opportunity for students to take ownership of their success and empower them to accomplish academic and personal goals. The system helps faculty and academic advisors connect and communicate with students as issues arise. The additional cross-wide partnerships create a culture of collaboration focused upon the best interest of UTTC students.

Academic related concerns such as attendance, missing assignments, or classroom behavior will result in an early alert being issued by faculty. When an early alert is issued, the student will receive an email requesting them to make arrangement to follow up with the instructor and/or their academic advisor. Students receiving an early alert should make the necessary arrangements to set up and meet with faculty as soon as possible to generate a plan of success.

G. ACADEMIC HONESTY

Students are expected to complete their own work. Academic dishonesty includes plagiarism; cheating on assignments or examinations; engaging in unauthorized collaboration on academic work; taking, acquiring, or using course materials without faculty permission; submitting false or incomplete records of academic achievement; acting alone or in cooperation with another to falsify records or to dishonestly obtain grades, honors, awards, or professional endorsement; altering, forging, misrepresenting, or misusing an academic record; or fabricating or falsifying data, research procedures, or data analysis. Refer to [Academic Affairs](#) policies and procedures handbook for further information.

H. STUDENTS WITH DISABILITIES

United Tribes Technical College recognizes its responsibility for making reasonable accommodations to ensure there is no discrimination on the basis of a disability. The Disabilities Services Office coordinates reasonable accommodations, support services, and appropriate referrals for the purpose of removing barriers and providing an equitable learning environment. If you have a disability, please contact the [Disabilities Services](#) (DS) office at (701) 221-1516 or email at dss@uttc.edu.

I. TITLE IX STATEMENT

Title IX is a federal civil rights law that prohibits discrimination on the basis of sex, including sexual harassment, rape and sexual assault. United Tribes Technical College is committed to upholding the law and standards that promote respect and human dignity in a safe environment. Sexual misconduct and relationship violence in any form violates UTTC's mission, cultural values, Student Code of Conduct, and may also violate federal and state law. If you or someone you know has been impacted by sexual assault, dating and domestic violence, stalking, or sexual exploitation, UTTC has resources available on the [Title IX website](#). you can find the appropriate resources on the UTTC campus and in the community

J. SOCIAL DISTANCING AND FACE MASKS

United Tribes Technical College understands the importance of the health and safety of our campus community. In an effort to serve our students and community members, we are taking continual efforts to reduce risk and increase cleanliness of our campus locations. As part of our effort to protect the campus community, all students, staff, and instructors are required to observe social distancing and wear face masks at all times while in the classrooms. Face masks will be available at the entrances of buildings and hand sanitizer will be available throughout each building.

Students who require accommodations should contact the Disability Services Office at dss@uttc.edu, or (701) 221-1516 to submit the appropriate documentation. Should you become sick or be required to quarantine during the semester, notify the instructor immediately using the contact method described in the syllabus. Students who require accommodations should contact the Disability Services Office to implement the appropriate accommodations required to submit course work during an extended absence.

K. TECHNOLOGY REQUIREMENTS

To ensure that you are using the recommended personal computer configurations, please refer to the [minimal technology requirements](#).

COURSE SCHEDULE

SPRING 2022

Week	Academic Topic Instructional Strategy	Book Chapters	TOPICS COVERED	Assessment (Formative – Summative)
1 Jan 11 - 14	Introductions, Syllabi, Introduction to Physical Sciences	Prologue: The Nature of Science	A brief history of advances in science, mathematics and conceptual physical science, scientific methods, the scientific attitude, science limitations, the relationship of science to art and religion, technology, and what is physical sciences.	Memo on indigenous contributions to STEM due next class <i>Read Chapter 1 for the next class</i>
2 Jan 17 - 21	*No School 1/17 MLK Physics	Chapter 1: Patterns of motion and equilibrium	Aristotle on motion, Galileo's concept of Inertia, mass, net force, Equilibrium rule, support force, the force of friction, speed and velocity, acceleration Additional Topics: Units, math symbols, reading equations, and excel	Chapter 1 Quiz Problems: 34, 36, 38, 40, 42, 44, 48, 50, 54, 64, 68, 72, 74, 78, 80, 82, 84, 88, 90 <i>Read Chapter 2 for the next class</i>
3 Jan 24 - 28	Physics	Chapter 2: Newton's Laws of Motion	Newton's First, Second, and Third Laws of Motion, forces and interactions	Chapter 2 Quiz Problems: TBD <i>Read Chapter 3</i>

				<i>for the next week</i>
4 Jan 31 – Feb 4	Physics	Chapter 3: Momentum and Energy	Momentum and impulse, Conservation of Momentum, energy and work, Work-Energy Theorem, Conservation of Energy, machines, efficiency, sources of energy	Chapter 3 Quiz Problems: TBD <i>Read Chapter 4 for the next week</i>
5 Feb 7 - 11	Physics	Chapter 4: Gravity, Projectiles, and Satellites	The Universal Law of Gravity, gravity and distance: the Inverse Square Law, weight and weightlessness, universal gravitation, projectile motion, fast-moving projectiles- satellites, circular satellite orbits, elliptical orbits, escape speed	Chapter 4 Quiz Problems: TBD <i>Read Chapter 5 for the next week</i>
6 Feb 14 - 18	Physics	Chapter 5: Fluid Mechanics	Density, pressure, buoyancy in a liquid, Archimedes' Principle, pressure in a gas, atmospheric pressure, Pascal's Principle, buoyancy in a gas, Bernoulli's Principle	Chapter 5 Quiz Problems: TBD <i>Read Chapter 6 for the next week</i>
7 Feb. 21 - 25	*No School 2/21 President's Day	Chapter 6: Thermal Energy and Thermodynamics	Temperature, absolute zero, heat, quantity of heat, the Laws of Thermodynamics, entropy, specific heat capacity, thermal expansion, expansion of water	Chapter 6 Quiz Problems: TBD <i>Read Chapter 7 for the next week</i>
	Physics			
8 Feb 28 – Mar 4	Physics	Chapter 7: Heat Transfer and Change of Phase	Conduction, convection, radiation, Newton's Law of Cooling, climate	Chapter 7 Quiz Problems: TBD <i>Read Chapter 8</i>

			change and the Greenhouse Effect, heat transfer and change of phase, boiling, melting and freezing, energy and change of phase	<i>for the next week</i>
9 Mar 7 - 11	Midterm Grades Due 3/11	Chapter 8: Static and Current Electricity	Electric charge, Coulomb's Law, electric field, electric potential, voltage sources, electric current, electrical resistance, Ohm's Law, electric circuits, electric power	Chapter 8 Quiz Problems: TBD <i>Read Chapter 9 for the week we return from spring break</i>
	Physics			
Mar 14 – 18 Spring Break – No Classes				
10 Mar 21 - 25	Physics	Chapter 9: Magnetism and Electromagnetic Induction	Magnetic poles, magnetic fields, magnetic domains, electric currents and magnetic fields, magnetic forces on moving charges, electromagnetic induction, generators and alternating current, power production, the transformer- boosting or lowering voltage, field induction.	Chapter 9 Quiz Problems: TBD <i>Read Chapter 10 for the next week</i>
11 Mar 28 – Apr 1	Physics	Chapter 10: Waves and Sounds	Vibrations and waves, wave motion, transverse and longitudinal waves, sound waves, reflection and refraction of sound, forced vibrations and resonance, interference, Doppler Effect, bow waves and the sonic boom, musical sounds	Chapter 10 Quiz Problems: TBD <i>Read Chapter 11 for the next week</i>
12 Apr 4 - 8	Physics	Chapter 11: Light	Electromagnetic spectrum, transparent	Chapter 11 Quiz Problems: TBD

			and opaque materials, reflection, refraction, color, dispersion, polarization	<i>Read Chapter 12 for the next week</i>
13 Apr 11 - 15	*No School 4/15 Good Friday	Chapter 12: Atoms and the Periodic Table	Atoms, elements, protons and neutrons, the Periodic table, physical and conceptual models, identifying atoms using a spectroscope, Quantum Hypothesis, electron waves, the Shell Model	Chapter 12 Quiz Problems: TBD <i>Read Chapter 14 for the next week</i>
	Chemistry			
14 Apr 18 - 22	*No School 4/18 Easter Monday	Chapter 14: Elements of Chemistry	Chemistry: central science, submicroscopic world, physical and chemical properties and determining changes, elements to compounds, naming compounds, advent of nanotechnology	Chapter 14 Quiz Problems: TBD <i>Read Chapter 16 for the next week</i>
	Chemistry			
15 Apr 25 - 29	Chemistry	Chapter 16: Mixtures	Most materials are mixtures, the Chemist's classification of matter, solutions, solubility, soaps detergents and hard water, purifying the water we drink, wastewater treatment	Chapter 16 Quiz Problems: TBD <i>Read Chapter 26, 27, and 28 for the next week</i>
16 May 2 - 6	Finals Week	Chapter 26: The Solar System	Ch 26: The Solar system and its formation, the Sun, the inner and outer planets, Earth's moon, failed planet formation	Chapter 26, 27, & 28 Quizzes Team Presentation on either Ch 26, 27, and 28. <i>Presentations start on Monday with one, with the other two</i>
	Astronomy	Chapter 27: Stars and Galaxies Chapter 28: The Structure of Space and Time	Ch 27: Observing the night sky, the brightness and colors of the stars, the Hertzsprung-Russell Diagram, the life cycle of	

			stars, black holes, galaxies Ch 28: Looking back in time, cosmic inflation, general relativity, special relativity, dark matter	<i>being at the final time.</i>
GRADES DUE	May 9th			