



EDUC 4314.06 – Teaching Science in the Middle and High School

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Term Fall 2026
Location of Course Online
Office Hours: 2:00 – 3:30 pm on Monday and Wednesday or by appointment

Course Description

Pedagogical content knowledge (PCK) provides a foundation for the development of knowledge for teaching and learning in middle and high school science. A Teaching for Understanding and Responsive Teaching approach will be emphasized in the study of selected science topics drawn from the life and physical sciences.

Student Learning Outcomes

This course is designed to prepare you to teach science in grades 5-12. To achieve this goal, you will have the opportunity to explore science as a way of knowing the world and as a tool for problem solving. We will be actively engaged in doing science as well as talking and reading about science. We will be exploring science as it relates to the formal classroom setting and the informal settings outside the classroom. We will be examining science as it relates to and can be integrated with, other subject areas.

Course Topics and/or Student Learning	Activities	Assessment (including performance-based)
Integrate content standards in a variety of curricula that are developmentally appropriate, interesting, and relevant to student's lives, organized around inquiry, and connected with other school subjects.	Ambitious Science Teaching (AST) and Content Knowledge for Teaching (CKT) Science Claim Evidence Reasoning Lesson Analysis (Video)	Lesson/Unit Plans Discussions/Reflections Performances of understanding
Create and teach lessons that reflect accurate knowledge of science content, the nature of science, science process skills, use of technology in science teaching, assessment, and science pedagogy.	Lesson Plans/Unit Plans Creation Assessment Questions Evaluation	Lesson/unit plan format Performances of understanding
Reflect upon their teaching experience noting areas of strength and weakness and develop plans to improve practice.	Lesson/Unit Plan review	Reflections Discussions
Choose from a variety of activity types in order to teach science in a way to address student needs including collaboration with colleagues, other school professionals, and the community.	NSTA CK-12 Texas Gateway Coreknowledge Studies Weekly	Lesson/Unit Plan Format

COURSE ASSIGNMENTS & EVALUATION

Class Participation/Discussions (20%)

Canvas Module/Activities (25%)

Reflections (20%)

Final Project (35%)

Detailed schedule assignment information and expectations, and assignment schedule, and expectations will be posted on Canvas.

Grading Criteria

- A 90-100% of points
- B 80-89% of points
- C 70-79% of points
- D 60-69% of points
- F below 59.9% of total points

COURSE POLICIES

It is my goal for each of you to benefit and grow professionally throughout this course. I believe in open communication so we can all learn from each other. You are expected to actively participate in our course activities so we may practice open dialogue. I also welcome you to visit with me in email, phone, or we can schedule a Zoom session. We can discuss the concept being discussed, your course performance, or anything else you would like.

Participation Expectations

This course is designed for face-to-face and online delivery. You should assume we have material to discuss/digest every week unless you are notified by your instructor. This course utilizes small-group learning activities, whole-class discussions, demonstrations, and outside-of-school activities to present science content to assist in successful teaching of the middle and high school science content. Regular attendance is very important since much of what we have to learn will be experienced in the college classroom. Face-to-face and synchronous classes begin promptly at the scheduled class time. Asynchronous classes will be at your own pace within the parameters of the module. Please e-mail me before class if you plan on being absent. Please allow up to 48 hours for response to an email.

Mobile Devices (e.g. iPads, Cell Phones)/Laptops:

All electronic devices need to be set to silent mode during class time. Devices may be used for class activities ONLY. Laptops will enhance your class experience but should be closed unless needed during the activity.

Assignment Submission:

For written assignments a “page” is defined as:

- 8½” x 11” paper
- Times New Roman or Arial 12-point font
- Double-spaced (unless otherwise directed)
- 1-inch margin on all sides.
- Put page numbers on the top right-hand side.
- Put your name, title of the assignment and date submitted on your paper.

Papers that do not meet these specifications will not be accepted. With respect to format and style, your paper should conform to the latest edition APA Manual.

Late Work:

Assignments are posted with due dates and expected to be submitted on Canvas. Assignments and projects are expected to be handed in on time and are expected to be submitted on Canvas even if you are not in class. You may turn in your assignment early. An assignment will be considered late if it is not turned in the day and time it is due. Immediately following the due date and time, you will be given a 0 for missing work. ***Late work will be accepted 4 days after the due date for partial credit. However, you must notify the instructor via email that you have submitted the assignment in order to receive a grade. After day 4, no late work will be accepted.***

Attendance: This course is part of your professional practice. You are expected to attend every face-to-face and synchronous class meeting. Course objectives and performance outcomes cannot be met unless you attend class and participate in class activities. If you are absent for an extended period of time, you should make arrangements to explore options such as retaking the course or taking an incomplete grade. If you miss more than two in-class periods, you will need to make an appointment with the instructor. If you are going to be absent for an exam, you must contact the instructor on or before the scheduled time the exam is to be given. You are responsible for all information given in class, online, and in the syllabus.

Read assigned articles prior to each class meeting. You are responsible for this information on tests as well as during class participation. Criteria for all assignments will be available in class and posted online unless otherwise notified by the instructor.

Canvas:

Canvas modules will be provided for all readings, activities, and assignments. Safe Assign/Unicheck is a tool that will be used to check a document for plagiarism. The tool provides feedback as to whether or not the text in a document is a close match with other

documents on the Internet, in journal databases, and submissions to Canvas. If a student is caught plagiarizing, a grade of zero will be given as well as a disposition for cheating.

All written assignments as well as all quizzes and exams are individual assignments. Students may not collaborate on individual assignments. Unauthorized collaboration is considered cheating and will be handled according to University Policies and the Students Standards of Academic Conduct.

Suggested Resources

Windschitl, M., Thompson, J., & Braaten, M. (2020). Ambitious science teaching. Harvard Education Press.

Digital Resources

Texas Education Agency (TEKS) –

<http://ritter.tea.state.tx.us/rules/tac/chapter112/ch112a.html>

**The Texas Higher Education Coordinating Board College and Career Readiness Standards –
College and Career Readiness Standards**

<http://reportcenter.highered.texas.gov/agency-publication/miscellaneous/crs-tx-ccrs-final-2009/>

Class Web Sites

<https://www.ck12.org/>

<https://www.coreknowledge.org/>

<https://www.texasgateway.org/>

<https://lead4ward.com/resources/>

<https://www.eie.org/>

<https://www.nisenet.org/>

<http://www.BIE.org>

<http://www.Learner.org>

<http://www.edutopia.org>

<http://essea.strategies.org/>

<http://www.globe.gov>

<https://www.teachingchannel.org/>

<http://www.teachertube.com/>

Additional selected readings will be provided by the instructor or through the NSTA Learning Center and other sources.

SOE Mission

The mission of the SOE is to prepare competent and passionate professionals in the field of education; to advance knowledge and expertise; and to impact this field locally, regionally, nationally, and internationally.

SOE Vision

The SOE will be a global leader in responding to needs in the fields of education, with a focus on the East Texas region, by creating innovative academic and scholarly pathways and partnerships.

UT TYLER'S SCHOOL OF EDUCATION STANDARDS FOR EDUCATOR PREPARATION PROGRAMS

Texas Education Standards: The School of Education are committed to teaching and implementing the Texas Educator Standards at the highest level. The School of Education faculty use the Texas Education Standards, along with the Interstate New Teacher Assessment and Support Consortium (InTASC) standards used by educator preparation programs throughout the United States.

The list of Texas Education Standards can be accessed [here](#).

Standard 1	Instructional Preparation - Teachers understand how students learn, and they prepare for instructional delivery by designing lessons, evaluating instructional materials, leveraging their knowledge of students, and engaging in a thorough process for lesson internalization.	All A-F
Standard 2	Instructional Delivery and Assessment - Teachers intentionally apply their knowledge of students and the learning process to implement high-quality instruction and assessment practices that are research- and evidence-based and informed by student work.	All A-D
Standard 3	Content Pedagogy Knowledge and Skills - Teachers show a full understanding of their content and related pedagogy and the appropriate grade-level TEKS.	All A-B
Standard 4	Learning Environment - Teachers maintain a safe and supportive learning environment that is characterized by respectful interactions with students, consistent routines, high expectations, and the development of students' self-regulation skills.	All A-B
Standard 5	Professional Practices and Responsibilities - Teachers are self-aware and consistently hold themselves to a high standard for individual development. They collaborate with other educational professionals; communicate regularly with stakeholders; maintain professional relationships; comply with federal, state, and local laws; and conduct themselves ethically and with integrity.	All A-C

UNIVERSITY POLICIES

UT Tyler Honor Code

Every member of the UT Tyler community joins together to embrace: Honor and integrity that will not allow me to lie, cheat, or steal, nor to accept the actions of those who do.

For a full list of university policies including information related to the topics listed below, see Canvas.

- Students Rights and Responsibilities
- Campus Carry
- Tobacco-Free University
- Grade Replacement/Forgiveness and Census Date Policies
- State-Mandated Course Drop Policy
- Disability Services
- Student Absence due to Religious Observance
- Student Absence for University-Sponsored Events and Activities
- Social Security and FERPA Statement
- Emergency Exits and Evacuation
- Student Standards of Academic Conduct
- UT Tyler Resources for Students

Student Resources:

Resources to assist you in the course

- [UT Tyler Student Accessibility and Resource \(SAR\) Office](#) (provides needed accommodations to students with document needs related to access and learning)
- [UT Tyler Writing Center](#)
- [The Mathematics Learning Center](#)
- [UT Tyler PASS Tutoring Center](#)
- [UT Tyler Supplemental Instruction](#)
- [Upswing \(24/7 online tutoring\) - covers nearly all undergraduate course areas](#)
- [Robert Muntz Library](#) and [Library Liaison](#)
- [Canvas 101](#) (learn to use Canvas, proctoring, Unicheck, and other software)
- Digital Support Toolkit (for supported courses only. Students are automatically enrolled in the toolkit for supported courses)
- LIB 422 -- Computer Lab where students can take a proctored exam
- [The Career Success Center](#)
- [UT Tyler Testing Center](#)
- [Office of Research & Scholarship Design and Data Analysis Lab](#)

Resources available to UT Tyler Students

- [UT Tyler Counseling Center](#) (available to all students)

- [MySSP App](#) (24/7 access to Student Support Program counseling through phone or chat and online wellness resources available in a variety of languages)
- [Student Assistance and Advocacy Center](#)
- [Military and Veterans Success Center](#) (supports for our military-affiliated students)
- [UT Tyler Patriot Food Pantry](#)
- [UT Tyler Financial Aid and Scholarships](#)
- [UT Tyler Student Business Services](#) (pay or set up payment plans, etc.)
- [UT Tyler Registrar's Office](#)
- [Office of International Programs](#)
- [Title IX Reporting](#)
- [Patriots Engage](#) (available to all students. Get engaged at UT Tyler.)

University Policies and Information

Withdrawing from Class

Students may [withdraw](#) (drop) from this course using the [Withdrawal Portal](#). Withdrawing (dropping) this course can impact your Financial Aid, Scholarships, Veteran Benefits, Exemptions, Waivers, International Student Status, housing, and degree progress. Please speak with your instructors, consider your options, speak with your advisor, and visit the One-Stop Service Center (STE 230) or email enroll@uttyler.edu to get a complete review of your student account and the possible impacts to withdrawing. We want you to make an informed decision. UT Tyler faculty and staff are here for you and often can provide additional support options or assistance. Make sure to carefully [read the implications for withdrawing from a course and the instructions](#) on using the [Withdrawal portal](#)..

Texas law prohibits students from dropping more than six courses during their entire undergraduate career*. The six courses dropped includes those from other 2-year or 4-year Texas public colleges and universities. Consider the impact withdrawing from this class has on your academic progress and other areas, such as financial implications. We encourage you to consult your advisor(s) and Enrollment Services for additional guidance. **CAUTION #1:** Withdrawing before census day does not mean you get a full refund. Please see the [Tuition and Fee Refund Schedule](#). **CAUTION #2:** All international students must check with the [Office of International Programs](#) before withdrawing. All international students are required to enroll full-time for fall and spring terms. **CAUTION #3:** All UT Tyler Athletes must check with the Athletic Academic Coordinator before withdrawing from a course. **CAUTION #4:** All veterans or military-affiliated students should consult with the [Military and Veterans Success Center](#).

* Students who began college for the first time before 2007 are exempt from this law.

Artificial Intelligence Statement

UT Tyler is committed to exploring and using artificial intelligence (AI) tools as appropriate for the discipline and task undertaken. We encourage discussing AI tools' ethical, societal, philosophical, and disciplinary implications. All uses of AI should be acknowledged as this aligns with our commitment to honor and integrity, as noted in UT Tyler's Honor Code. Faculty and students must not use protected information, data, or copyrighted materials when using any AI tool. Additionally, users should be aware that AI tools rely on predictive models to generate content that may appear correct but is sometimes shown to be incomplete, inaccurate, taken without attribution from other sources, and/or biased. Consequently, an AI tool should not be considered a substitute for traditional approaches to research. You are ultimately responsible for the quality and content of the information you submit. Misusing AI tools

that violate the guidelines specified for this course is considered a breach of academic integrity. The student will be subject to disciplinary actions as outlined in UT Tyler's Academic Integrity Policy.

AI is encouraged during the course, and appropriate acknowledgment is expected.

You can use AI programs (ChatGPT, Copilot, etc.) in this course. These programs can be powerful tools for learning and other productive pursuits, including completing assignments in less time, helping you generate new ideas, or serving as a personalized learning tool. However, your ethical responsibilities as a student remain the same. You must follow UT Tyler's Honor Code and uphold the highest standards of academic honesty. This applies to all uncited or improperly cited content, whether created by a human or in collaboration with an AI tool. If you use an AI tool to develop content for an assignment, you must cite the tool's contribution to your work.

Final Exam Policy

Final examinations are administered as scheduled. If unusual circumstances require that special arrangements be made for an individual student or class, the Dean of the appropriate college, after consultation with the faculty member involved, may authorize an exception to the schedule. Faculty members must maintain student final examination papers for a minimum of three months following the examination date.

Incomplete Grade Policy

If a student, because of extenuating circumstances, is unable to complete all of the requirements for a course by the end of the semester, then the instructor may recommend an Incomplete (I) for the course. The "I" may be assigned in place of a grade *only when **all** of the following conditions are met:* (a) the student has been making satisfactory progress in the course; (b) the student is unable to complete all coursework or final exam due to unusual circumstances that are beyond personal control and are acceptable to the instructor, and (c) the student presents these reasons before the time that the final grade roster is due. The semester credit hours for an Incomplete will not be used to calculate the grade point average.

The student and the instructor must submit an Incomplete Form detailing the work required and the time by which the work must be completed to their respective department chair or college dean for approval. The time limit established must not exceed one year. Should the student fail to meet all of the work for the course within the time limit, then the instructor may assign zeros to the unfinished work, compute the course average for the student, and assign the appropriate grade. If a grade has yet to be assigned within one year, then the Incomplete will be changed to an F, or NC. If the course was initially taken under the CR/NC grading basis, this may adversely affect the student's academic standing.

Grade Appeal Policy

Disputes regarding grades must be initiated within sixty (60) days from the date of receiving the final course grade by filing a Grade Appeal Form with the instructor who assigned the grade. A grade appeal should be used when the student thinks the final course grade awarded does not reflect the grades earned on assessments or follow the grading scale as documented in the syllabus. The student should provide the rationale for the grade appeal and attach supporting document about the grades earned. The form should be sent via email to the faculty member who assigned the grade. The faculty member reviews the rationale and supporting documentation and completes the instruction section of the form. The instructor

should return the form to the student, even if a grade change is made at this level. If the student is not satisfied with the decision, the student may appeal in writing to the Chairperson of the department from which the grade was issued. In situations where there is an allegation of capricious grading, discrimination, or unlawful actions, appeals may go beyond the Chairperson to the Dean or the Dean's designee of the college from which the grade was issued, with that decision being final. The Grade Appeal form is found in the [Registrar's Form Library](#).

NOTE: The Grade Appeal Form is different from the Application for Appeal form submitted to the Student Appeals Committee, which does not rule on grade disputes as described in this policy.

Disability/Accessibility Services

In accordance with Section 504 of the Rehabilitation Act, Americans with Disabilities Act (ADA) and the ADA Amendments Act (ADAAA), the University of Texas at Tyler offers accommodations to students with learning, physical, and/or psychological disabilities. If you have a disability, including a non-visible diagnosis such as a learning disorder, chronic illness, TBI, PTSD, ADHD, or a history of modifications or accommodations in a previous educational environment, you are encouraged to visit <https://hood.accessiblelearning.com/UTTyler/> and fill out the New Student application. The Student Accessibility and Resources (SAR) office will contact you when your application has been submitted and an appointment with the Assistant Director Student Accessibility and Resources/ADA Coordinator. For more information, including filling out an application for services, please visit the SAR webpage at <https://www.uttyler.edu/disability-services>, the SAR office located in the Robert Muntz Library, LIB 460, email saroffice@uttyler.edu, or call 903.566.7079."

Military Affiliated Students

UT Tyler honors the service and sacrifices of our military-affiliated students. If you are a student who is a veteran, on active duty, in the reserves or National Guard, or a military spouse or dependent, please stay in contact with your faculty member if any aspect of your present or prior service or family situation makes it difficult for you to fulfill the requirements of a course or creates disruption in your academic progress. It is important to make your faculty member aware of any complications as far in advance as possible. Your faculty member is willing to work with you and, if needed, put you in contact with university staff who are trained to assist you. The [Military and Veterans Success Center \(MVSC\)](#) has campus resources for military-affiliated students. The MVSC can be reached at MVSC@uttyler.edu or via phone at 903.565.5972.

Students on an F-1 Visa

To remain in compliance with Federal Regulations requirements you must do the following:

- Traditional face-to-face classes: Attend classes on the regular meeting days/times.
- Hybrid Classes: Attend all face-to-face classes convened by the instructor according to the schedule set for your specific course.
- Online course: Only one online course can count toward your full-time enrollment. Students are expected to be fully engaged and meet all requirements for the online course.

Academic Honesty and Academic Misconduct

The UT Tyler community comes together to pledge that "Honor and integrity will not allow me to lie, cheat, or steal, nor to accept the actions of those who do." Therefore, we enforce the [Student Conduct and Discipline policy](#) in the Student Manual Of Operating Procedures (Section 8).

FERPA

UT Tyler follows the Family Educational Rights and Privacy Act (FERPA) as noted in [University Policy 5.2.3](#). The course instructor will follow all requirements to protect your confidential information.

Absence for Official University Events or Activities

This course follows the practices related to [Excused Absences for University Events or Activities](#) as noted in the Catalog.

Absence for Religious Holidays

This course follows the practices related to [Excused Absences for Religious Holy Days as noted in the Catalog](#).

Absence for Pregnant Students

This course follows the requirements of Texas Laws SB 412, SB 459, SB 597/HB 1361 to meet the needs of pregnant and parenting students. Part of the supports afforded pregnant students includes excused absences. Faculty who are informed by a student of needing this support should make a referral to the Parenting Student Liaison. NOTE: Students must work with the Parenting Student Liaison in order to receive these supports. Students should reach out to the Parenting Student Liaison at parents@uttyler.edu and also complete the [Pregnant and Parenting Self-Reporting Form](#).

Campus Carry

We respect the right and privacy of students who are duly licensed to carry concealed weapons in this class. License holders are expected to behave responsibly and keep a handgun secure and concealed. More information is available at <http://www.uttyler.edu/about/campus-carry/index.php>.