



IS 352.51E, 20848, Science Inquiry II

COURSE SYLLABUS: Spring 2024
Class meets Tu 5:00-7:40 pm, CHEC 229

INSTRUCTOR INFORMATION

Instructor: Elyzabeth Graham

Office Hours: Available after class or by appointment W/TH via Zoom

University Email Address: Elyzabeth.Graham@tamuc.edu

Preferred Form of Communication: email

Communication Response Time: 24 hours

COURSE INFORMATION

Materials – Textbooks, Readings, Supplementary Readings

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Textbook(s) Required: **IS 352 Lab manual** available only at the campus bookstore.

ISBN: 978-1-

64565-154-3

These are custom printed. Confirm you get the correct manual, 352 **Third Edition**.

Software Required: regular MS office (or equal)

Recommended Materials: notebook, calculator, computer, printer or printer access, and note taking materials

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Printing options determined

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Course Description

Science topics and themes are chosen to emphasize broad concepts highlighted in the Texas and national science standards. Topics will include conservation laws, systems in nature, the nature of scientific inquiry, and the presentation of scientific information. The course will be taught by an inquiry-based method, modeling instructional techniques proved effective by current educational research. This course is designed for interdisciplinary education majors.

Science is an interesting and diverse topic; learning and teaching can be enjoyable as well as educational. Science is what allows mankind to function in a productive manner. We will explore the

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question, “What is Science?” and help each individual grasp an understanding of their own teaching philosophy.

Students will participate through hands-on experiments, in a cooperative learning environment with integrated lectures. Pedagogy, methods and techniques, critical thinking, data analysis, proper handling of equipment, and content will be explored in this course.

Topics Covered:

Matter and Interactions

The main purpose of this module is to introduce students to theories and models that can help explain some of the properties of materials, changes in those properties, and interactions between materials. The ‘small particle theory’ is used in the Physical Changes Unit to account for the properties of gases, liquids, and solids, and changes in state. In each of these physical changes, the identities of the materials, as well as their masses, remain the same. In the chemical reactions unit, students will consider situations where the identities of the materials change. Students will learn how to classify materials according to macroscopic properties and learn that mass is conserved even during chemical reactions. Students will learn about the small particle theory for chemical reactions, and how elements and compounds are composed of small particles—atoms, molecules, and formula units and can then ‘explain’ why mass is conserved in chemical reactions (or physical changes) in terms of the same number of atoms of the reactants and products in the chemical reaction. Students will explore how materials are classified and organized according to their physical and chemical properties (Periodic Table), and how the organization can be explained in terms of atoms and ions and the behavior of valence electrons. Finally, students will use a simple model to describe ionic and covalent bonds and explain the chemical composition of molecules and formula units. Finally, if time allows, students will study light and color; to approximate the color spectrum and understand that light travels in straight lines; its behavior can be represented light ray diagrams.

Physical Changes

The purpose of this unit is to introduce students to the small particle theory of gases, liquids, and solids. Through experiments, demonstrations, and movies, they will observe macroscopic phenomena and then, with the aid of computer simulations, try to explain the phenomena in terms of small particle theory. Students will consider gases and investigate changes in the macroscopic quantities of pressure, volume, temperature, and mass which leads them to a mathematical statement of the relationship between these quantities known as the Ideal Gas Law. Students will explore the changes of states of matter, consider liquids, and the change of state from gas to liquid. They are introduced to different forms of matter and can be used to distinguish substances from one another such as the characteristic property of density. Students also examine the differences between solids and liquids. Students will examine the role of energy in physical changes and come up with energy models for the heating and cooling of substances, and for changes of state between solids, liquids, and gases.

Chemical Reactions

In this unit, students use the small particle model to explain changes to materials (gases, liquids or solids) that do not involve changes to the physical identities of the materials. They will explore what happens when materials interact in a way such that their chemical identities change indicating a chemical reaction. Students will learn about the evidence supporting the claim that a chemical reaction has occurred and classify materials as pure substances (elements and compounds), and

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mixtures (solutions and heterogeneous mixtures) according to macroscopic criteria. Students will gather evidence to conclude that mass is conserved during chemical reactions as well as during physical changes. Students will learn about the small particle theory of chemical reactions, and that elements and compounds are composed of small particles—atoms, molecules, and formula units and become familiar with both pictorial and chemical equation representations of reactions. Students learn about how elements can be classified and organized and develop a general understanding of the organization of the Periodic Table. Students will learn how the macroscopic organization of the Periodic Table can be simply ‘explained’ in terms of atoms, ions, and the behavior of valence electrons. They will use the Lewis Dot Diagram Model to describe both ionic and covalent bonding, which provides insight as to why molecules or formula units are comprised of very specific numbers of different atoms. Students will use what they have learned to explain everyday chemical and physical phenomena.

The Living World

The main purpose of this unit is to introduce students to the living world around us. Students learn that biological structures at multiple levels of organization perform specific functions and processes that affect life, and to relate the functions of different types of biomolecules, including carbohydrates, lipids, proteins, and nucleic acids to the function of cells. Students will also compare prokaryotic and eukaryotic cells. Students will be introduced to biological systems and how they are composed of multiple levels and will be able to summarize the interactions that occur between levels and how those interactions can affect multiple species. They will be introduced to the mechanisms of genetics, including learning the role of nucleic acids in gene expression. Students will be able to identify components of DNA and explain how the nucleotide sequence specifies some traits of an organism. Students will also explain, analyze and evaluate how evidence of common ancestry among groups is provided by the fossil record and explain how natural selection produces change in populations and not in individuals.

Student Learning Outcomes

1. Students will gain a better pedagogical understanding.
 - Students will identify and practice different teaching methods.
 - Students will identify different learning styles.
 - Students will be able to determine how teaching and learning styles complement or support material in various situations.
 - Students will better understand the NGSS/TEKs alignment and how that process applies to content delivery.
2. Students will be better prepared to achieve success completing the TExES exam.
 - Students will understand the basic methodology of science through experimentation.
 - Students will understand the meaning, application, and concepts of force and motion: types of forces, Newton’s laws of motion, energy, conservation of energy, waves, astronomy basics, and historical contributors such as Aristotle, Galileo, and Newton.
3. Students will assist the instructor through cooperative learning to provide interesting and practical science knowledge and skills for taking instruction into the classroom and everyday life.
 - Students will learn and practice student centered instruction.
 - Students will develop a plan for laboratory safety and classroom management through daily practice and techniques.

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COURSE REQUIREMENTS

Minimal Technical Skills Needed

D2L will be used for grades and as a venue/repository of review material. All work to be graded will be submitted within the D2L platform, besides exams which will be given in person to the professor. Students should have basic understanding and ability to manage fundamental computer skills such as MS Word, Excel, & PowerPoint (or similar).

Instructional Methods

This class will meet in CHEC 229 from 5:00-7:40pm on Tuesdays. It is important that we start class on time to complete the hands-on labs; please practice professionalism and make it to class on time. The instructional methods for this course will vary with the topic being explored. Students will be attentive through any lecture, providing the instructor/presenter their full attention. Questions are welcomed and encouraged during lecture; however, students will not engage in "personal discussions" thus disrupting class.

Students will be working in groups to complete labs throughout the semester. This is a hands-on methods course. It is imperative that **students do NOT miss a class** as their group will not have each member's contribution. Any **missed classes will not be made up**. For clarification purposes, there are NO make-up labs. This includes any lab section of a test.

Student Responsibilities or Tips for Success in the Course

This class requires regular attendance as much of the content is delivered in a hands-on format that will build from one lesson to the next. If you miss a class, you may miss the skills needed for the next and future lessons. Missing even one class can cause a significant gap in your learning and understanding. The best thing you can do to be successful in this class is to not miss any classes.

GRADING

Final grades in this course will be based on the following scale:

- A = 90%-105%
- B = 80%-89%
- C = 70%-79%
- D = 60%-69%
- F = 59% or Below

Weights of the assessments in the calculation of the final letter grade.

		<u>Tentative Exam Dates</u>
Exams (2 midterms)	40%	1) Feb 27
Labs and Homework	25%	2) April 9
Mini Lesson Project	20%	3) May 7 Extra Credit Practice TExES Exam
Class participation	15%	
<u>Practice TExES Exam</u>	<u>Extra Credit: 5%</u>	
TOTAL	100%	

Assessments

Labs - There will be no make-up labs. If you are absent on a day we take a grade for a lab, you will receive a grade of zero; there is no way to make up work missed. Daily assignments and labs are 40% of the course

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grade. One grade will be dropped at the end of the semester, this is generally your lowest lab and homework grade. There will be one opportunity for extra credit at the end of the semester coming from a practice TEXES exam. At the end of each lab, a scan will be uploaded to D2L and checked for completeness to assign lab grades.

Exams - If you know you are going to miss an exam, please **notify me in writing**, via email, to plan to **take the test early**. If you miss an exam, the make-up must be scheduled and completed before the graded exams are returned to the class, generally the next class day. For example if you miss an exam, you will have to coordinate with me to take it within the week; I teach another course on Mondays which would be a great option.

Homework - Up to 12 homework assignments will be assigned throughout the semester. The lowest grade will be dropped. Homework is due at the beginning of class. Homework will be accepted up to a week late without penalty. Homeworks will be in the course manual unless otherwise stated.

Class participation - You will receive a participation grade for each class day (except the first day and exam days) based on your participation in group activities. The lowest three grades will be dropped.

Participation grade calculation:

1. An absence will result in a zero for the missed class. This includes excused absences. If you have more than 3 excused absences, the resulting zeroes will be dropped before the calculation of your average. (See course policies below for details on excused absences.)
2. Missing 15-35 minutes of class will result in a 20-point deduction. Missing more than 35 minutes of class will result in a 50-point deduction. This includes tardiness, leaving early before finishing all class activities, or missing a portion of the middle of class.
3. The instructor will provide students with their participation through the D2L-Brightspace grade portal.

Mini Lesson Project – More details will be available in the second half of the semester. Students will choose a competency from the TEXES exam and prepare a short introductory activity and lesson at their intended grade level and then model the lesson for the class. There will be a full class period to work on the assignment and get instructor feedback before final presentations.

Tentative Schedule

Jan 16 – Lab 1: Understanding Science

Jan 23 – Lab 2: Physical versus Chemical Changes

Jan 30 – Lab 3: Adhesion, Cohesion, Capillary Action, and Surface Tension

Feb 6 – Lab 4: Density

Feb 13 – Lab 5: Chromatography

Feb 20 – Lab 6: Periodic Table

Feb 27 – TBD (Review or finishing labs if needed)

March 5 – Labs 1-6 Test

March 12 - Spring Break

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March 19 – Lab 7: Bonds

March 26 – Lab 8: Foods

April 2 – Lab 9: Life Science

April 9 – TBD (Review or finishing labs if needed)

April 16 – Labs 7-9 Test

April 23 – Mini Lesson Project Prep Day

April 30 – Mini Lesson Presentation Day

May 7 – Optional Practice TExES Exam

These dates are subject to change and the D2L Page will give a better guide to weekly activities as the semester progresses. Feel free to contact me with any questions about the schedule

TECHNOLOGY REQUIREMENTS

LMS

All course sections offered by Texas A&M University-Commerce have a corresponding course shell in the myLeo Online Learning Management System (LMS). Below are technical requirements

LMS Requirements:

<https://community.brightspace.com/s/article/Brightspace-Platform-Requirements>

LMS Browser Support:

https://documentation.brightspace.com/EN/brightspace/requirements/all/browser_support.htm

Zoom Video Conferencing Tool

https://inside.tamuc.edu/campuslife/CampusServices/CITESupportCenter/Zoom_Account.aspx?source=universalmenu

ACCESS AND NAVIGATION

You will need your campus-wide ID (CWID) and password to log into the course. If you do not know your CWID or have forgotten your password, contact the Center for IT Excellence (CITE) at 903.468.6000 or helpdesk@tamuc.edu.

Note: Personal computer and internet connection problems do not excuse the requirement to complete all course work in a timely and satisfactory manner. Each student needs to have a backup method to deal with these inevitable problems. These methods might include the availability of a

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backup PC at home or work, the temporary use of a computer at a friend's home, the local library, office service companies, Starbucks, a TAMUC campus open computer lab, etc.

COMMUNICATION AND SUPPORT

If you have any questions or are having difficulties with the course material, please contact your Instructor.

Technical Support

If you are having technical difficulty with any part of Brightspace, please contact Brightspace Technical Support at 1-877-325-7778. Other support options can be found here:

<https://community.brightspace.com/support/s/contactsupport>

Interaction with Instructor Statement

You are invited to take advantage of office hours. Those times are set aside weekly to meet with students. If the hours scheduled do not work with your schedule, please email and schedule an appointment. If you have a quick question, you are always welcome to shoot me an email, while I don't have a traditional office, I'm happy to help.

If you know that you have an event that is going to require missing a class, please send this to me through email so that I can get it on my schedule.

I will post any changes to the schedule in D2L in the course announcements. Please check these regularly or even better, set the announcements to email you as they are posted.

COURSE AND UNIVERSITY PROCEDURES/POLICIES

Course Specific Procedures/Policies

Course Specific Policies

Violation of any class policies will be reflected on the student's final grade for the course.

1. Be professional. You are completing your degree and preparing for the classroom as the facilitator of instruction. Your attitude should reflect your professionalism, which should include the remaining class policies.
2. Be here. Absences will result in lowering your overall grade, if you are not in class, you will miss important content. Much of the material covered in class builds from previous material so missing a class means a gap in content. If you know in advance that you are going to miss a class, please inform me in writing **via email**. If you know in advance that you are going to miss an exam, make arrangements with me to take the test early. Tests are handed back the very next class so you will only have one day to make up an exam.
3. Be on time. It is important that you arrive to class on time; tardiness is a direct reflection of your professional attitude. This class meets Tuesdays 5 – 7:40pm. Tardiness is a bad habit, very impolite, and unprofessional. We only meet once a week, so please strive to be on time.

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As a teacher, you will be expected to turn in grades on time as well as meeting other deadlines; again, be professional. Absences are not considered a “good reason” for turning in late assignments. All due dates are given in advance; take them seriously. While late work is accepted, it’s very rarely worthwhile to turn things in late

4. Be courteous. Cell phones will be turned off; failure to comply will result in the student being excused from class and receiving a zero for the daily assignments. I will give you my undivided attention and I expect the same of each student.
5. This class meets in a lab, which usually means food is prohibited, however due to the timing of this course, eating a non-disruptive snack will be allowed so long as we are not working with chemicals; you’ll be notified in advance if food cannot be brought into the classroom and a break will be provided.

Course Specific Procedures

1. Students are required to take all exams and must be completed before the exams are returned to the class. Exams are 40% of your grade; 20% each (x’s 2).
2. Students will be responsible for their learning and participate in all class activities with a positive, constructive attitude. Professionalism will be practiced.
3. Students will have all homework completed upon entering class. Late work is not accepted so do not be late to class. Students will not attempt to work on any material for another class.
4. Students will be uploading some assignments in the course shell. Other assignments will require printing materials for use in class. It is the student’s responsibility to make arrangements to print. For the project I can print materials if you do not have access to a printer. Always cite work, we do not want to practice plagiarism.
5. All homework and labs will be turned in to D2L. Please hand write in the course manual and then scan in the labs and homeworks depending on what is required each week. I will not ask you to remove pages from the lab manual, so scans will be the only way I can grade homework and labs.
6. Students will participate and contribute equally in-group activities. Failure to comply will be reflected in the non-compliant student's grade and will not be a detriment to the remaining group members. All collaborative assignments will have an individual grade for each student dependent upon their contribution, collaboration, content, and professionalism. If there is a conflict within a group, please see me.
7. Students are welcome to stay after class to talk to me or make an appointment if the posted hours do not fit the need. If you are struggling, seek assistance early, I am here to help you learn.

ALL students have the option to earn an A for this class, however extra credit is not usually offered. Although I have the right to drop a student for excessive absences; I won’t do so. Students have the right to earn an F if they decide not to complete the work. I generally do not offer or approve drops/incompletes for poor effort. Remember you are training to teach which will affect the next generation of students.

Syllabus Change Policy

The syllabus is a guide. Circumstances and events, such as student progress, may make it necessary for the instructor to modify the syllabus during the semester. Any changes made to the syllabus will be announced in advance.

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University Specific Procedures

Student Conduct

All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment. The Code of Student Conduct is described in detail in the Student Guidebook

http://www.tamuc.edu/student_guidebook/Student_Guidebook.pdf

Students should also consult the Rules of Netiquette for more information regarding how to interact with students in an online forum: <https://www.britannica.com/topic/netiquette>

TAMUC Attendance

For more information about the attendance policy please visit the [Attendance](#) webpage and [Procedures 13.99.99.R0.01](#)

<http://www.tamuc.edu/admissions/registrar/generalInformation/attendance.aspx>

<http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/academic/13.99.99.R0.01.pdf>

Academic Integrity

Students at Texas A&M University-Commerce are expected to maintain high standards of integrity and honesty in all of their scholastic work. For more details and the definition of academic dishonesty see the following procedures:

[Undergraduate Academic Dishonesty 13.99.99.R0.03](#)

[Undergraduate Student Academic Dishonesty Form](#)

<http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/documents/13.99.99.R0.03UndergraduateStudentAcademicDishonestyForm.pdf>

[Graduate Student Academic Dishonesty Form](#)

<http://www.tamuc.edu/academics/graduateschool/faculty/GraduateStudentAcademicDishonestyFormold.pdf>

<http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/undergraduates/13.99.99.R0.03UndergraduateAcademicDishonesty.pdf>

Students with Disabilities-- ADA Statement

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you have a disability requiring an accommodation, please contact:

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Office of Student Disability Resources and Services

Texas A&M University-Commerce

Velma K. Waters Library Rm 162

Phone (903) 886-5150 or (903) 886-5835

Fax (903) 468-8148

Email: studentdisabilityservices@tamuc.edu

Website: [Student Disability Services](#)

<https://www.tamuc.edu/student-disability-services/>

Nondiscrimination Notice

Texas A&M University-Commerce will comply in the classroom, and in online courses, with all federal and state laws prohibiting discrimination and related retaliation on the basis of race, color, religion, sex, national origin, disability, age, genetic information or veteran status. Further, an environment free from discrimination on the basis of sexual orientation, gender identity, or gender expression will be maintained.

Campus Concealed Carry Statement

Texas Senate Bill - 11 (Government Code 411.2031, et al.) authorizes the carrying of a concealed handgun in Texas A&M University-Commerce buildings only by persons who have been issued and are in possession of a Texas License to Carry a Handgun. Qualified law enforcement officers or those who are otherwise authorized to carry a concealed handgun in the State of Texas are also permitted to do so. Pursuant to Penal Code (PC) 46.035 and A&M-Commerce Rule 34.06.02.R1, license holders may not carry a concealed handgun in restricted locations.

For a list of locations, please refer to the [Carrying Concealed Handguns On Campus](#) document and/or consult your event organizer.

Web url:

<http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/34SafetyOfEmployeesAndStudents/34.06.02.R1.pdf>

Pursuant to PC 46.035, the open carrying of handguns is prohibited on all A&M-Commerce campuses. Report violations to the University Police Department at 903-886-5868 or 9-1-1.

A&M-Commerce Supports Students' Mental Health

The Counseling Center at A&M-Commerce, located in the Halladay Building, Room 203, offers counseling services, educational programming, and connection to community resources for students. Students have 24/7 access to the Counseling Center's crisis assessment services by calling 903-886-5145. For more information regarding Counseling Center events and confidential services, please visit www.tamuc.edu/counsel

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AI use policy [Draft 2, May 25, 2023]

Texas A&M University-Commerce acknowledges that there are legitimate uses of Artificial Intelligence, ChatBots, or other software that has the capacity to generate text, or suggest replacements for text beyond individual words, as determined by the instructor of the course.

Any use of such software must be documented. Any undocumented use of such software constitutes an instance of academic dishonesty (plagiarism).

Individual instructors may disallow entirely the use of such software for individual assignments or for the entire course. Students should be aware of such requirements and follow their instructors' guidelines. If no instructions are provided the student should assume that the use of such software is disallowed.

In any case, students are fully responsible for the content of any assignment they submit, regardless of whether they used an AI, in any way. This specifically includes cases in which the AI plagiarized another text or misrepresented sources.

13.99.99.R0.03 Undergraduate Academic Dishonesty

13.99.99.R0.10 Graduate Student Academic Dishonesty

Department or Accrediting Agency Required Content

COURSE OUTLINE / CALENDAR

Science

Standard I. The science teacher manages classroom, field, and laboratory activities to ensure the safety of all students and the ethical care and treatment of organisms and specimens.

Standard II. The science teacher understands the correct use of tools, materials, equipment, and technologies.

Standard III. The science teacher understands the process of scientific inquiry and its role in science instruction.

Standard IV. The science teacher has theoretical and practical knowledge about teaching science and about how students learn science.

Standard V. The science teacher knows the varied and appropriate assessments and assessment practices to monitor science learning.

Standard VI. The science teacher understands the history and nature of science.

Standard VII. The science teacher understands how science affects the daily lives of students and how science interacts with and influences personal and societal decisions.

Standard VIII. The science teacher knows and understands the science content appropriate to teach the statewide curriculum (Texas Essential Knowledge and Skills [TEKS]) in physical science.

Standard X. The science teacher knows and understands the science content appropriate to teach the statewide curriculum (Texas Essential Knowledge and Skills [TEKS]) in Earth and space science.

Standard XI. The science teacher knows unifying concepts and processes that are common to all sciences.

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https://tea.texas.gov/sites/default/files/EC_6_Science_Final%283%29_0.pdf

https://tea.texas.gov/sites/default/files/4-8sci_0.pdf

https://www.tx.nesinc.com/content/docs/TX391_CoreSubjects_PrepManual.pdf (pp 27-33)

https://www.tx.nesinc.com/Content/StudyGuide/TX_SG_obj_116.htm#standards

In science, many of the concepts work in conjunction with others. The weekly outline is general and not specific. We will work at a pace needed for student success.

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