



IS-352-02E, Science Inquiry II
COURSE SYLLABUS: Spring, 2022

INSTRUCTOR INFORMATION

Instructor: Hilary Kakanis

Office Location: *Online*

Office Hours: Tuesdays, 7 - 7:30 PM or by appointment

University Email Address: **Hilary.Kakanis@tamuc.edu**

Preferred Form of Communication: **Email through D2L**

Communication Response Time: 24 hours, weekdays

COURSE INFORMATION

Materials – Textbooks, Readings, Supplementary Readings

- **Textbook(s) Required** Course-specific lab packet **IS 352B** available only from the campus bookstore **ISBN: 978-1-61740-644-7**
- Software Required: none
- Other Materials:
 - simple calculator
 - notebook
 - notetaking materials



The required lab packet is specific for this course and is available only at the campus bookstore, please verify that you are getting the one designated **IS 352B** (ISBN: **978-1-61740-644-7**) at the time of your purchase. A calculator is recommended for each student; a simple inexpensive 5-function calculator will work. In addition to the text & class packet, students will need something for note-taking, and computer/printer access. Make printing arrangements before you need them.

Course Description

Science topics and themes are chosen to emphasize broad concepts highlighted in the Texas- and National Science Standards. Topics include fundamental physical and chemical processes such as the chemistry of the environment, macromolecules of life, systems in nature, and the nature of scientific inquiry. The course will be taught using an inquiry-based method, modeling instructional techniques proven effective by current educational research. This course is designed for interdisciplinary education majors.

Science is an interesting and diverse topic; it is the instructor's intent to demonstrate that 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 question, "What is Science?" and help each individual grasp an understanding of his/her own philosophy of teaching.

Students will participate in a cooperative learning environment through hands-on experiments and lectures (through powerpoint presentations, video presentations, and/or office hours on request). 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.

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

The syllabus/schedule are subject to change.

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 to classify materials as pure substances (elements and compounds), and 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.

Waves, Sound, Light, & Color

The main purpose of this unit is to introduce students to a wave model, studying different types of waves and phenomena that can be explained in terms of waves. Students will be introduced to properties of mechanical waves in one dimension, two dimensions, and three dimensions according to types of waves and mediums. Wave properties include amplitude, frequency, wavelength, and wave speed. They also learn about both transverse and longitudinal waves. The unit on light includes a very brief introduction to electromagnetic waves, describing visible light. Students use the light ray model to explore pinhole and shadow phenomena and to learn about the reflection and refraction of light. As time allows, students will learn about how the eye/brain system perceives color and explore both color addition of lights and color subtraction with color filters.

Students learn that light is a special type of wave-motion known as an electromagnetic wave. Unlike mechanical waves, electromagnetic waves do not require a medium to travel through. Visible light occupies a tiny fraction of the entire range of electromagnetic waves, and within that range, the different frequencies (wavelengths) of light are perceived as different colors.

Students will learn that light travels in straight lines and that its behavior can be represented by light ray diagrams. Finally, if time allows, students will study light and color; to approximate the color spectrum by assuming it consists of three bands: red for the longest wavelengths, green for the middle range, and blue for the shortest. After a description of the three-color receptors in the eye, students learn about the color addition of lights.

Student Learning Outcomes

1. Students will be better prepared to achieve success completing the TExES exam.
 - a. Students will understand the basic methodology of science through experimentation.
 - b. Students will understand the meaning, application, and concepts of the periodic table.
 - c. Students will understand the properties of matter; states/phase changes.
 - d. Students will learn the basic functions of balancing equations, acids/bases, and reactions.
 - e. Students will learn the basic concepts of waves, types of waves, propagation, & the E&M Spectrum.
 - f. Students will prove content mastery through taking and passing exams.
2. Students will gain a better pedagogical understanding.
 - a. Students will identify and practice different teaching methods.
 - b. Students will identify different learning styles.
 - c. Students will be able to determine how teaching and learning styles complement or support material in various situations.
 - d. Students will better understand the NGSS/TEKS alignment and how that process applies to content delivery.
3. Students will assist the instructor through cooperative learning to provide interesting and practical scientific knowledge and skills for taking instruction into the classroom and everyday life.
 - a. Students will identify student-centered versus teacher-centered instructional methods.
 - b. Students will practice student-centered instruction.
 - c. Students will develop a plan for laboratory safety and classroom management.

COURSE REQUIREMENTS

Minimal Technical Skills Needed

D2L will be used for grades and as a venue/repository of review material and PowerPoints. All work to be graded will be turned in digitally through D2L. The following formats are approved for turning in assignments: .pdf, .doc, .docx, and .odt. If using google suite, please convert the document to one of those formats through their "file > download" menu. The following formats are not to be used and, if submitted, will not be graded: .pages, .jpb, and .png. Students should have a basic understanding and ability to manage fundamental computer skills such as MS Word, Excel, & PowerPoint (or similar)

Instructional Methods

The instructional methods for this course will vary with the topic being explored. Students will be required to access course lectures, online labs, and tutorial videos through internet access. Stable internet access will be a must for the successful completion of this course.

Labs

Students will be working at home to complete labs throughout the semester. Regular online attendance is necessary to ensure understanding of the material. Online labs are a critical part of this course, and cannot be made up if missed or not turned in by posted due dates. For clarification purposes, there are NO make-up labs. This includes any lab section of a test.

The syllabus/schedule are subject to change.

Discussion Posts

Each week you will be required to participate in discussions with your classmates. At a minimum, there will be 2 original posts in two separate topics, and 3 responses to other classmates' posts in any topic.

Note: One post counts as 100 words or more on topic. Posts with fewer words or posts not addressing the week's class topics will not be considered for grading. Of course, the discussion should be allowed to flow naturally, and shorter posts will naturally occur, including one-word posts of the type "Yes!" and "I agree!" or "No!". This is fine, and indeed necessary - it is just that the grading will be based upon posts of 100 words or more.

Reading Reflections

Reading reflections are also part of this course. Each week, you will be given experiments to analyze where you will identify the variables of the experiment, the goal of the experiment, and align it to the Science TEKS for a specific grade level. These reading reflections are an essay format and should consist of 150 words or more, explaining the required objectives for each assignment.

Netiquette reminder

A reminder that netiquette should be observed at all times: please make sure you visit and understand the following resources: <http://www.albion.com/netiquette/>
<http://www2.nau.edu/d-elearn/support/tutorials/discrubrics/netiquette.php>

Student Responsibilities or Tips for Success in the Course

Pre-service teachers need to incorporate technology into their learning so that they can take this knowledge and understanding into their classrooms as they facilitate learning. Throughout this course, students will be using tools and technology to complete laboratory procedures. Students will need computer and printer access or a pdf editor (check out dochub) to complete various assignments. All written work should be typed, including citations as needed. Emailing your assignments instead of uploading them to the class D2L Portal is not acceptable. Students may expect a large amount of printing through the duration of this course if uncomfortable with working through pdf editors.

This course is web-based and students will be participating through the MyLeo portal. Students must have access to a scanner or smartphone that takes quality images (.pdf only - no .jpg or .png or etc) to submit homework and assignments. I like/use CamScanner and Genius Scan; there are many different apps that will work with various smartphones and some/many are free.

- Students should have access to Zoom to participate in office hours. It is essentially a more sophisticated version of Skype and can support conversations between multiple people. It works through a web browser; I will email a link ahead of each office hour.
- Students will need to use the current Flash enabled browser. For PC users, the recommended browser is Google Chrome or Mozilla Firefox, and for Mac users; the most current version of Mozilla Firefox is recommended.
- Students will need regular access to a computer with broadband internet connection. The minimum computer requirements are:
 - o 512 MB of RAM, 1 GB or more preferred
 - o Broadband connection required-courses are video intensive
 - o Video display capable of high-color 16-bit display (1024 x 768) or higher resolution

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- Students must have:
 - A sound card, usually integrated into your computer
 - Speakers/headphones
 - For courses utilizing video-conferencing tools, and/or online proctoring solutions, a webcam and microphone are required.
 - For office hours, you may make use of the type-chat function if you do not have a webcam or microphone; I will be watching the chat.
- Students must have antivirus software installed, up to date, and enabled.
- Both versions of JAVA (32 & 64 bit) must be installed and up to date on your computer. Java 7, update 51 is required to support the learning management system. The most current version of Java can be downloaded at: <https://www.java.com/en/download/manual.jsp>
- Run a browser check through the Pearson LearningStudio Technical Requirements website.
- Browser Check:
https://help.blackboard.com/Learn/Student/Ultra/Getting_Started/Browser_Support/Browser_Checker
 Running the browser check will ensure your internet browser is supported.
 - Popups are allowed.
 - JavaScript is enabled.
 - Cookies are enabled.
- For additional information about system requirements, please see: System Requirements for Brightspace D2L: <https://secure.ecollege.com/tamuc/index.learn?action=technical>
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- Students will need some additional free software (plug-ins) for enhanced web browsing. Ensure that you download the free versions of the following software:
 - Adobe Reader: <https://get.adobe.com/reader/>
 - Adobe Flash Player (version 17 or later): <https://get.adobe.com/flashplayer/>
 - Adobe Shockwave Player: <https://get.adobe.com/shockwave/>
 - Apple Quicktime: <http://www.apple.com/quicktime/download/>
- At a minimum, you must have Microsoft Office 2013, 2010, 2007 or Open Office. Microsoft Office is the standard office productivity software utilized by faculty, students, and staff. Microsoft Word is the standard word processing software, Microsoft Excel is the standard spreadsheet software, and Microsoft PowerPoint is the standard presentation software.
 - Please note: Open Office is free.
 - Please additionally note: Using google suite software and downloading as an office product to upload as an office product works just fine if you are more comfortable in the Google suite.
 - If you do not have Microsoft Office, you can check with the bookstore to see if they have any student copies.
- Copying and pasting, along with attaching/uploading documents for assignment submission, will also be required. Copying and pasting answers straight from the internet to complete assignments is not acceptable, however.

GRADING

The following scale will be used for determining final course grades:	Grade Scale 100% > A > 90% 89% > B > 80% 79% > C > 70% 69% > D > 60% 60% > F	Tentative Exam Dates 1) Week 6 2) Week 11 3) Week 16
Daily assignments/labs	45 %	
Tests (10% each midterm, 15% final)	35 %	
Discussion Posts	10 %	
Reading Reflections	10 %	

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Plagiarism or cheating will not be tolerated for any reason and a violation will provide the individual(s) involved with a failing grade and a referral to the dean's office for further disciplinary action.

Assessments

Daily labs-There will be no make-up labs. If you fail to turn in a lab assignment, you will receive a grade of zero; there is no way to make up for missed work.

Lectures- There will be a few video lectures and tutorial videos. If you miss notes, I recommend asking a couple of people for a copy of their notes so that you have good coverage of the material missed. You will be responsible for all material at the time of the test.

Exams- Exams are administered through D2L. During a week with an exam, the exam will be posted automatically, and students will have a 4-day window to complete the exam. Exams have a 90-minute time limit, and once a student begins an exam, it must be completed in one sitting, so ensure that you have enough time to complete the exam prior to beginning

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

YouSeeU Virtual Classroom Requirements:

<https://support.youseeu.com/hc/en-us/articles/115007031107-Basic-System-Requirements>

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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 coursework 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 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

Students are welcome to come to virtual office hours. For a specific time outside of the scheduled office hours please feel welcome to send an email to schedule an appointment.

All written communication needs to be through email at this address: Hilary.Kakanis@tamuc.edu

Students will be expected to regularly check their email provided to/by the University through eCollege/myLeo as this address is provided to the professor. In **ALL emails**, students are required to include the following information in the subject line: **the course name, your name, and a (very) brief statement/inquiry.**

e.g. Subject: IS 352, Your Name, lesson #3 question

This will allow all inquiries to be answered as soon as possible. If a response is not received within 2-weekdays then assume there was a problem with the email and please follow up through other contact options.

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. The syllabus/schedule is subject to change.
2. **Be here** (virtually). Although this is a web-based class, regular login will be required to keep up with the daily assignments. As a teacher, you will be expected to turn in grades on time as well as meet other deadlines; again, be professional. Technology issues are not considered a “good reason” for turning in late assignments. All due dates are given in advance; take them seriously as LATE WORK IS NOT ACCEPTED.
3. **Students will have all homework completed no later than the assigned due date/time.** Late work is not accepted so do not be late with uploading your homework or discussion posts. As a teacher, you will be expected to turn in grades on time as well as meet 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 as **late work is not accepted.**
4. **Be courteous.** Follow proper netiquette when interacting with the instructor and classmates in discussion boards.

Course Specific Procedures

1. **Students will be required to take all exams and must prove content mastery by completing at least two tests with a grade of 70 or better to pass this course.** It may be possible for students to complete all coursework with a high enough average to pass the overall class without completing any of the tests with a grade above 70. **If fewer than 2 exams are not completed with a score above 70, the student will receive a failing grade for the course.** As teachers, our students are expected to complete exams to advance, and we must be prepared to do the same. Combined exams total 35% of the final grade. Exams will be open and accessible for at least 4 days each, to allow for scheduling conflicts associated with an online class.
2. Students will be responsible for their learning and participate in all class activities with a positive attitude. Professionalism will be practiced in this course.
3. Students will have all homework completed/printed upon entering class. Late work is not accepted so do not wait until the last minute to complete/upload assignments.
4. Students will be printing a large amount of material through the semester for regular assignments/homework. Students will need computer and printer access. Students will be

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responsible for their own printing needs. Emailing material to the professor (or TA) to turn in assignments is not an option.

5. Students are responsible for ensuring all work is submitted in an approved format. The following formats are approved for turning in assignments: .pdf, .doc, .docx, and .odt. The following formats are not to be used, and if submitted, will not be graded: .pages, .jpg, and .png. Links to a document on Google Pages are also not accepted. Please take the requirements for assignment submission seriously, as there are no exceptions to this policy. D2L does not support some of these formats and will not open them for grading, and others are resource-intensive if they must be printed out for any reason.
6. Students are welcome to contact me via email or make an appointment for a Zoom meeting if email cannot fit the need for assistance. If you are struggling, seek assistance early. Students have the option to earn an A for this class, however extra credit is not usually offered. Students have the ability to earn an A or the right to earn an F if they decide to not complete the work. I generally do not offer or approve drops/incompletes for poor effort and I don't drop a student for excessive absences.

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.

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/Admissions/oneStopShop/undergraduateAdmissions/studentGuidebook.aspx>

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 [Procedure 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](#)

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

[Graduate Student Academic Dishonesty 13.99.99.R0.10](#)

<http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/graduate/13.99.99.R0.10GraduateStudentAcademicDishonesty.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

Office of Student Disability Resources and Services

Texas A&M University-Commerce

Gee Library- Room 162

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

Fax (903) 468-8148

Email: studentdisabilityservices@tamuc.edu

Website: [Office of Student Disability Resources and Services](#)

<http://www.tamuc.edu/campusLife/campusServices/studentDisabilityResourcesAndServices/>

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.

The syllabus/schedule are subject to change.

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.

COURSE OUTLINE / CALENDAR

The syllabus and/or schedule are subject to change.

DOMAIN IV – SCIENCE

Competency 024	Safe and Proper Laboratory Processes
Competency 025	Scientific Inquiry
Competency 026	Impact on Daily Life/Environment
Competency 028	Theory and Practice of Science Teaching
Competency 029	Assessments in Science Learning
Competency 031	Physical Science-physical and chemical properties
Competency 032	Physical Science-energy
Competency 034	Life Science

In science, many of the concepts work in conjunction with others, the weekly outline is general and not specific. The outline is approximated for a long semester.

Week	Topic
1	Syllabus, experiments, pedagogy, & expectations
2-6	Physical Changes Test 1
7-11	Chemical Reactions Test 2
12-16	Waves, Sound, & Light Final (non-cumulative)

Dates are approximate and may change according to the progression of course content.