



**IS 352, 80148, Science Inquiry II**  
COURSE SYLLABUS: Fall 2020

**INSTRUCTOR INFORMATION**

Instructor: Patrick Ross  
Office Location: McFarland Science (STC) 148  
Office Hours: Tuesdays and Thursdays: 9:00 am – 10:00 am  
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University Email Address: Patrick.Ross@tamuc.edu  
Preferred Form of Communication: **email**  
Communication Response Time: 24 hours, weekdays

**COURSE INFORMATION**

Materials – Textbooks, Readings, Supplementary Readings

- Textbook(s) **Required** Course specific lab packet **IS 352B** available digitally from Van-Griner Learning. A link will be posted on D2L. **SKU: 978-1-64565-013-3**
- Technology Requirements: Desktop/laptop or comparable device that can access D2L and view video
- Other Materials:
  - Device capable of taking digital pictures such as a smartphone or digital camera
  - Printer preferred but not required



The required lab packet is specific for this course and is available from Van-Griner Learning. 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.

*The syllabus/schedule are subject to change.*

## **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 lecture. 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.

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## **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 reactions.

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

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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 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 the blue for the shortest. After a description of the three-color receptors in the eye, students learn about color addition of lights.

### **Student Learning Outcomes**

1. 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 the periodic table.
  - Students will understand the properties of matter; states/phase changes.
  - Students will learn the basic functions of: balancing equations, acids/bases, and reactions.
  - Students will learn the basic concepts of waves, types of waves, propagation, & the E&M Spectrum.
  - Students will prove content mastery through taking and passing exams.
2. 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.
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.

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- Students will identify student centered versus teacher centered instructional methods.
- Students will practice student centered instruction.
- 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 submitted to D2L. 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 be hosted online. The instructional methods for this course will vary with the topic being explored. A typical week will have 1 recorded lecture and 2 recorded labs posted to D2L. As the course progresses, the labs will be substituted with problem practice. Additional lectures or solved problems may be posted based on the needs of the class. Questions are welcomed and encouraged to be submitted either directly to my email or to a D2L discussion board.

Turning in work through D2L is the only accepted format. Please do not email work directly. If you need assistance with D2L, please contact the instructor immediately.

## **GRADING**

The following scale will be used for determining final course grades:

Daily assignments/labs	35 %
Tests (10% each midterm, 15% final)	35 %
Attendance	10 %
Notebook	20 %

90% < A < 100%

80% < B < 89%

70% < C < 79%

60% < D < 69%

F < 60%

### **Tentative Exam Dates**

1) February 11th

2) March 3rd

3) **TBD**

The syllabus and/or schedule are subject to change.

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

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## Assessments

**Lectures** – Lectures will be provided in a video format. An assignment will follow the video to help highlight key concepts. The lecture assignments will be used as an attendance grade and must be completed by the start of the next week. These assignments should not be considered a substitute for proper note taking.

**Labs** – Labs will be provided in a video format. The labs will have corresponding assignments to be completed as homework. These assignments typically will come from the course lab manual. Additional problems or assignments outside of the lab manual may be assigned dependent on the topic being covered.

**Exams**- Exams will be completed through D2L. The exams will be timed and only offered on a specific date. If you know you are going to miss an exam, please make arrangements in advance to take it early.

## 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](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>

## 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](mailto: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 backup PC at home or work, the temporary

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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 visit during office hours or at any other time I am in my office and available. For a specific time outside of the scheduled office hours please feel welcome to call my office or email to schedule an appointment.

All written communication needs to be through email at this address:

[Patrick.Ross@tamuc.edu](mailto:Patrick.Ross@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 email**, 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, Patrick Ross, 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.

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2. **Be here.** Absences will result in lowering your overall grade and counts as 15% of your grade for this course. If you know in advance that you are going to miss class, please inform me in writing-email is preferred.

This class meets twice weekly, missing even one class results in missing a large amount of material. Excessive absences may result in the student being dropped from class with a failing grade.

3. **Be on time.** Tardiness will be a direct reflection of your professional attitude. This class meets on Tuesday and Thursday mornings from 11:00-12:15 pm. This is a very short amount of time and must be utilized effectively. It is important that you arrive to class on time. Excessive tardiness will result in a low participation grade for this course and the result will be reflected in student's final grade. Tardiness is a bad habit, impolite, disruptive, and unprofessional.

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 as late work is not accepted.

4. **Be courteous.** Cell phones will be turned off; failure to comply will result in the student being excused from class. I will give you my undivided attention and I expect the same of each student.

**No electronic devices** (this includes use of a computer/tablet/iPad/recording device/any other) will be permitted during class unless arrangements are made in advance and approved by me. I have a set of computers which will be supplied for any necessary lab activities.

5. This class meets in a lab, which means food is prohibited. Drinks are okay as long as they are in a closed or covered container. I realize the time of day makes this difficult, try to plan ahead and grab a quick snack on your way to class.

### **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. Combined exams total 35% of the final grade.

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.

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3. Students will have all homework completed/printed 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 contribute to a grade specific notebook assignment which is strategically formatted to aid the student in planning lessons, locating appropriate supplementary curriculum/experiments, and becoming competent in the use and navigation of the NGSS & TEKS. Additional instructions will be provided. This assignment is 20% of the course grade.
5. 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 responsible for their own printing needs. Emailing material to the professor (or TA) to print for you is **not** an option. All assignments will be graded in print format, turning in assignments via email will assure work is not counted late (provided it is emailed before the start of class) however you are still responsible for printing and turning in a print copy at the next class.
6. Students will participate and contribute equally in group activities; this includes cleaning work area after class/labs. All collaborative assignments will have an individual grade for each student dependent upon their individual contribution, collaboration, content, and professionalism. Failure to comply will be reflected in the non-compliant student's grade and will not be a detriment to the remaining group members.
7. Students are welcome to visit during office hours, or make an appointment if the posted hours do not fit the need. 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](#).

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<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](mailto:studentdisabilityservices@tamuc.edu)

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

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<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.

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.

### **Harassment Policy**

Title IX makes it clear that violence and harassment based on sex and gender are Civil Rights offenses subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories such as race, national origin, etc. If you or someone you know has been harassed or assaulted, you can find the appropriate resources here:

University Title IX Contact: James Vanbebber, 903-886-5996, <mailto:TitleIX@tamuc.edu>

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## COVID-19

A&M-Commerce requires the use of face-coverings in all instructional and research classrooms/laboratories. Exceptions may be made by faculty where warranted. Faculty have management over their classrooms. Students not using face-coverings can be required to leave class. Repetitive refusal to comply can be reported to the Office of Students' Rights and Responsibilities as a violation of the student Code of Conduct.

Students should not attend class when ill or after exposure to anyone with a communicable illness. Communicate such instances directly with your instructor. Faculty will work to support the student getting access to missed content or completing missed assignments.

### University resource webpages:

SAFE Team: [https://www.tamuc.edu/CampusLife/Victim Advocacy and Support/](https://www.tamuc.edu/CampusLife/Victim%20Advocacy%20and%20Support/)

[http://www.tamuc.edu/CampusLife/CampusServices/studentRights/Title IX.aspx](http://www.tamuc.edu/CampusLife/CampusServices/studentRights/Title%20IX.aspx)

<http://www.tamuc.edu/campuslife/campusServices/universityPoliceDepartment/crimePrevention/sexualAssault.aspx>

University Counseling Center: 903-886-5145,

<http://www.tamuc.edu/campusLife/campusServices/counselingCenter/default.aspx>

Campus police: <mailto:upd@tamuc.edu>, call 911 in emergency situations

### External resources:

Crisis center of NorthEast Texas: <http://www.ccnex.org>

Know your IX: <http://knowyourix.org>

End rape on campus: <http://endrapeoncampus.org>

Clery Center for Security on Campus: <http://clerycenter.org>

Not Alone: <http://changingourcampus.org/about-us/not-alone/>

## COURSE OUTLINE / CALENDAR

**The syllabus and/or schedule are subject to change.**

### DOMAIN IV – SCIENCE

*The syllabus/schedule are subject to change.*

- Competency 001 (Lab Processes, Equipment and Safety)**
- Competency 002 (History and Nature of Science)**
- Competency 003 (Impact of Science)**
- Competency 004 (Concepts and Processes)**
- Competency 005 (Students as Learners and Science Instruction)**
- Competency 006 (Science Assessment)**
- Competency 008 (Physical and Chemical Properties)**
- Competency 009 (Energy and Interactions)**
- Competency 010 (Energy Transformations and Conservation)**

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.

<b>Week</b>	<b>Topic</b>	
1	Syllabus, experiments, pedagogy, & expectations	
2-6	Physical Changes	Test 1
7-12	Chemical Reactions	Test 2
13-15	Waves, Sound, & Light	Final (non-cumulative)

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

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