Foundational Approaches to Physical Science, SMTE 3315
Department of Physical and Environmental Science
Spring 2019

A. COURSE INFORMATION

Course number/section: SMTE 3315.A01, B01, C01
Class meeting time:
  A01: Monday/Wednesday, 2:00-3:55pm
  B01: Tuesday/Thursday, 2:00-3:55pm
  C01: Tuesday/Thursday, 4:30-6:25pm
Class location: EN 201

B. INSTRUCTOR INFORMATION

Instructor: Sabrina Krueger
Office location: CS 130A
Office hours: MW: 4-6:00pm. TR: 4-4:30pm.
e-mail: Sabrina.Krueger@tamucc.edu
Appointments: Available by appointment. Email to schedule a time.

C. COURSE DESCRIPTION

Catalog Course Description
Physical science topics such as simple machines, atoms, molecules, electricity and magnetism, sound, and light. Laboratory involvement will emphasize techniques of problem solving, data gathering, and data application. The course is taught following an inquiry based format and is recommended for future K-8 level science educators. SMTE 0096 is a co-requisite for this course. Documented completion of this safety training is required early in the semester for continued participation in this course. Safety training given during a laboratory meeting early in the semester is required for continued participation in this course.

D. PREREQUISITES AND COREQUISITES

Prerequisites
None

Corequisites
Enrollment in SMTE 3315 lab and SMTE 0096 Lab Safety Seminar

E. REQUIRED TEXTBOOK(S), READINGS AND SUPPLIES

Required Textbook(s)
Teacher’s Guide to Physical Science” by Reid, Tissot; Kendall Hunt 2009

Optional Textbook(s) or Other References
“Conceptual Physical Science” by Hewitt, Suchocki, Hewitt; Addison Wesley (any edition)
Supplies

- Science TEKS to reference, does not need to be printed out (www.tea.state.tx.us/rules/tac/chapter112/index.html)
- Basic calculator

F. STUDENT LEARNING OUTCOMES AND ASSESSMENT

Assessment is a process used by instructors to help improve learning. Assessment is essential for effective learning because it provides feedback to both students and instructors. A critical step in this process is making clear the course’s student learning outcomes that describe what students are expected to learn to be successful in the course. The student learning outcomes for this course are listed below. By collecting data and sharing it with students on how well they are accomplishing these learning outcomes students can more efficiently and effectively focus their learning efforts. This information can also help instructors identify challenging areas for students and adjust their teaching approach to facilitate learning.

The mission of SMTE 3315 is to spark interest in the minds of students, to have students question and analyze the world around them, and to have students think and to have fun, because scientific exploration should be fun. SMTE 3315 will help students prepare for career in science education. After successfully completing this course you will be able to envision how physical science is applied to the everyday world and be able to solve problems at the conceptual level with the use of basic calculation (+,-,/,*) when needed.

By the end of this course, students should be able to:

1) Conduct simple experiments following scientific method to test a variety of physical science phenomena.
2) Use Metric System for basic measurements with a ruler, a balance, and a measuring cylinder.
3) Describe a motion of an object and explain the effect of force on motion and law of inertia.
4) Gather information about a chemical element from periodic table and describe basic chemical properties of the element from gathered information.
5) Identify and describe physical properties of matter such as density, buoyancy, electrical and thermal conductivity, and magnetic properties.
6) Assemble a simple electrical circuit and be able to do a simple troubleshooting.
7) Discuss different forms of energy and implications of Law of conservation of energy.
8) Describe and explain basic phenomena of the sky such as lunar phases, change of seasons and day/night.
9) Describe the Earth as a system; identify and describe the basic components of Earth system and how they interact with each other.
10) Describe, explain, and discuss the impact of human activities on the nature.
11) Demonstrate problem solving skills and be able to apply the above material to a given situation.
12) Describe/demonstrate/discuss the theoretical and pedagogical methods in teaching the above material to elementary and middle school students.
G. INSTRUCTIONAL METHODS AND ACTIVITIES

Your grade will be comprised of four exams, four homework assignments, one practicum, and daily attendance. Every attendance question will have one question on material from the previous class. You must be on-time to class in order to take the attendance quiz.

H. MAJOR COURSE REQUIREMENTS AND GRADING

HOMEWORK

There will be informal homework assigned for practice and formal homework assigned for grade. The answers to all informal homework will be posted on class Blackboard page in each Learning Modules folder. **Students must keep up with informal homework to ensure a good grade on the test.** All formal homework will require a practical approach from students. Students will conduct simple experiments, grow a crystal, make an electrical maze, and build a fountain. You may work together, but turn in **independent and unique reports.** The due date for each project is indicated in the class schedule. There are specific requirements for each project; make sure to read and understand each project. If you are unsure about something, please ask. Each project is worth 25 points. Any reports submitted through Blackboard will be graded through SafeAssign. Only 20% similarity will be allowed.

HW#1. *A science report.*

Student will complete a pendulum experiment (studying three variables) and write a report. Reports will be submitted via SafeAssign on Blackboard. More information on the topic, due dates, rubric and the instructions are on Bb under assignments.

*By 11:59pm on due date, student will submit science report on Blackboard through the official report submission page, or points will be taken off. Submissions by email and Bb messages will not be graded.

HW#2. *Crystal Growing of NaCl (table salt), MgSO₄ (Epsom Salt), borax, sugar, alum, etc.*

Research how to grow two different types of crystals. It is not as easy as it sounds. There is no such thing as perfect instructions. Do not blindly follow the instructions you find – use your knowledge about the subject matter. Commercially purchased crystal growing kits are **not allowed.** You must turn in two labeled plastic bags with two different varieties of crystal specimens, one for each type of crystals and submit, via Blackboard, and a free format one-page essay summarizing your observation of the crystals’ growth. The due date, the rubric and the instructions are on the Bb under assignments.

*By 11:59pm on due date, student will submit science essay on Blackboard through the official report submission page, or points will be taken off. Submissions by email and Bb messages will not be graded. Students will bring crystals to class on due date.

HW#3. *An electrical maze* over the Earth and Space TEKS 4-5 grade.

Look in the textbook for the building instructions, pg. 111-112 and on BlackBoard for a rubric. **The design and choice of questions are subjects to grade.** Bring the maze
complete with 10 questions and answers related to a physical science topic covered in this
class, along with TEKS and grade level on the back of the board to class on the due date.
Mazes must be functional at the beginning of class on the due date and taken
away/recycled outside of the building.
*No online submission is necessary.

HW#4. **Fountain as a model of a plumbing system.**
Use only recycled materials!
Instructions for the construction and the due date are posted on Bb. No report is
necessary. Students will bring fountain to class on the due date and plumbing systems
must be functional at the beginning of class. Must be taken away and recycled. Points
will be deducted if project is found in a trashcan in the building.
*No online submission is necessary.

**PRACTICUM**
At the end of the semester every student must demonstrate his/her skills to measure length,
mass, and volume. The accuracy of measurement done by a student is the subject to grade.
Every student has to be able correctly classify rock (igneous, sedimentary or metamorphic)
based on observed properties of the given three rocks. Every student will have to complete
two of the listed below tasks.

1. Make necessary measurements and calculate an average speed of a moving object.
2. Make necessary measurements and identify the unknown solid material by calculated
density.
3. Determine the type of three unknown water solutions with use of either cabbage juice,
   litmus or pH paper.
4. Construct a simple electrical circuit containing a battery, bulbs and a switch according
to a diagram.
5. Find requested information about given atom from Periodic Table. Write down names
   and formulas for the molecules that this element can form with each of four other
   elements listed in the assignment.
6. Based on the given information make a graph and discuss what conclusion could be
drawn from that graph. Read the given graph and make a prediction based on the
   graph.
7. Construct a lever system. Predict and verify how much effort is needed to lift up
given weight with use of that lever system.

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<thead>
<tr>
<th>ACTIVITY</th>
<th>% of FINAL GRADE</th>
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<tbody>
<tr>
<td>Exams</td>
<td>50</td>
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<tr>
<td>Homework</td>
<td>20</td>
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<tr>
<td>Practicum</td>
<td>20</td>
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<td>Attendance</td>
<td>10</td>
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# I. COURSE CONTENT/SCHEDULE

<table>
<thead>
<tr>
<th>Topics</th>
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<tr>
<td>Introductions and expectations. The goal of “scientific literacy”.</td>
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<tr>
<td>The scientific method.</td>
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<td><del>No Class—Martin Luther King Jr. Day</del></td>
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<tr>
<td>Measurements and Data Collection.</td>
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<td>Calculations and Data Analysis.</td>
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<td>Observing Motion. Forces. Work and Energy.</td>
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<td>Gravity.</td>
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<td>Simple Machines.</td>
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<td><strong>Exam I Online</strong></td>
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<td><strong>Homework #1 (Pendulum Report) due on Blackboard @ 11:59pm.</strong></td>
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<td>The structure of Matter. Atoms and atomic particles.</td>
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<td>Periodic Table of Elements. Elements, Compounds, Mixtures.</td>
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<td>~Solar Lab~~</td>
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<td>Physical and Chemical changes. Chemical bonds. Chemical formulas.</td>
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<td>Acidic &amp; basic solutions. Solution testing.</td>
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<td>Properties of water. Heat and Temperature.</td>
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<td><strong>Exam II Online</strong></td>
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<td>~~~Spring Break: 3/11-3/14~~~</td>
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<tr>
<td>Nature of Electricity. Static Electricity. <strong>Crystal Specimens due in Class</strong></td>
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<tr>
<td><strong>Homework #2 (Crystal Growing Report) due on Blackboard @ 11:59pm.</strong></td>
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<tr>
<td>Electrical Circuits.</td>
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<td>Magnetism. Discussion of forms of energy.</td>
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<td><strong>Exam III Online</strong></td>
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<td>Earth Science. Atmosphere. Weather and Climate</td>
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<td><strong>Homework #3 (Circuit Maze) due in Class</strong></td>
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<td>Conservation/Recycling Activity</td>
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<td>Space Science Topics.</td>
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<td><strong>Exam IV Online</strong></td>
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<tr>
<td><strong>Homework #4 (Recycled Plumbing System) due in class.</strong></td>
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<td><em>Last day to sign up for Practicum</em></td>
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<td><strong>Practicum</strong></td>
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<td>A: Monday, May 7th, 4:30-7:00pm</td>
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<td>B: Tuesday, May 8th, 1:45-4:15pm</td>
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<td>C: Tuesday, May 8th, 4:30-7:00pm</td>
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Note: Changes in this course schedule may be necessary and will be announced to the class by the Instructor. The assignments and exams shown are directly related to the Student Learning Outcomes.
described in Section F.

J. **COURSE POLICIES**

**Attendance/Tardiness**
It is expected that all students will attend class regularly and *arrive on time*. The curriculum of this class is designed in such way that the major learning comes from activities during the actual class period. If you miss class or are late, you will lose the points for the daily attendance quiz, excused absences will not change this. Please keep contact information for group members on hand to find out what you have missed. If you complete an exam after the last on-time student has turned in their exam, 10% of the points will be deducted.

**Late Work and Make-up Exams**
Due dates for all assignments and exams are listed in the syllabus and will be listed on the class Blackboard page. If you know you will be missing class, please contact the professor, in advance, to make arrangements to turn in/complete work. Late work will receive a 10% per day penalty (including weekends). Work in electronic format (e-mail) will not be accepted unless prior arrangements have been made.

**Extra Credit**
Extra credit activities may be assigned throughout the semester, at the discretion of the instructor.

**Cell Phone Use**
Cell phones may not be used during class. If you must make a call, please step outside to do so. Students will be instructed to put cell phones away if they are out.

**Laptop Use**
Laptops may be used during class for note taking only.

**Food in Class**
Food is not to be consumed during class. Drinks in containers that seal are permitted.

**Missed Exam**
If you know in advance that you will miss an exam, please contact the instructor, in advance, as soon as possible to schedule a time to take the exam early. If you miss an exam due to unexcused circumstances, 10% of the exam grade will be deducted daily, beginning once the last on-time student turns in the exam. Makeup exams may be comprised of different questions or formats.

**Participation**
It is imperative that students attend class and actively participate in all laboratory activities. All in-class activities will be done in collaborative groups, so students must work as a team. If there are issues between group members that cannot be resolved, let
the instructor know and groups will be reassigned.

**Course Binder**
Each student should have a course binder or notebook where they keep all in class work and homework. Binders/notebooks should be brought to class every day. They should contain blank paper for assignments. Binders may be checked at random times during the semester. Being absent does not excuse a student from completing binder components or any assignments (see attendance policy). It is strongly encouraged that each student have the contact information for classmates to get assignments, if absent.

**Science in the Classroom**
This class is meant to be fun and educational. Although it is very important to get a great deal of work done in this course, it is equally important to make science relevant and interesting. Therefore asking questions is strongly encouraged. Related contemporary issues are relevant to the class, so if you've found an interesting newspaper clipping or watched a good documentary you would like to share with us, please mention and/or bring a copy of the article so we can discuss it. Physical Science is a living, breathing subject and is not restricted to the science building or old books with yellowing pages.

**K. COLLEGE AND UNIVERSITY POLICIES**

- **Academic Integrity (University)**
  University students are expected to conduct themselves in accordance with the highest standards of academic honesty. Academic misconduct for which a student is subject to penalty includes all forms of cheating, such as illicit possession of examinations or examination materials, falsification, forgery, complicity or plagiarism. (Plagiarism is the presentation of the work of another as one’s own work.) In this class, academic misconduct or complicity in an act of academic misconduct on an assignment or test will result in a failing grade.

- **Classroom/Professional Behavior**
  Texas A&M University-Corpus Christi, as an academic community, requires that each individual respect the needs of others to study and learn in a peaceful atmosphere. Under Article III of the Student Code of Conduct, classroom behavior that interferes with either (a) the instructor’s ability to conduct the class or (b) the ability of other students to profit from the instructional program may be considered a breach of the peace and is subject to disciplinary sanction outlined in article VII of the Student Code of Conduct. Students engaging in unacceptable behavior may be instructed to leave the classroom. This prohibition applies to all instructional forums, including classrooms, electronic classrooms, labs, discussion groups, field trips, etc.

- **Statement of Civility**
  Texas A&M University-Corpus Christi has a diverse student population that represents the population of the state. Our goal is to provide you with a high quality educational experience that is free from repression. You are responsible for following the rules of the
University, city, state and federal government. We expect that you will behave in a manner that is dignified, respectful and courteous to all people, regardless of sex, ethnic/racial origin, religious background, sexual orientation or disability. Behaviors that infringe on the rights of another individual will not be tolerated.

• **Deadline for Dropping a Course with a Grade of W (University)**
  I hope that you never find it necessary to drop this or any other class. However, events can sometimes occur that make dropping a course necessary or wise. *Please consult with your academic advisor, the Financial Aid Office, and me, before you decide to drop this course.* Should dropping the course be the best course of action, you must initiate the process to drop the course by going to the Student Services Center and filling out a course drop form. Just stopping attendance and participation WILL NOT automatically result in your being dropped from the class. Please consult the Academic Calendar ([http://www.tamucc.edu/academics/calendar/](http://www.tamucc.edu/academics/calendar/)) for the last day to drop a course.

• **Grade Appeals (College of Science and Engineering)**
  As stated in University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures, a student who believes that he or she has not been held to appropriate academic standards as outlined in the class syllabus, equitable evaluation procedures, or appropriate grading, may appeal the final grade given in the course. The burden of proof is upon the student to demonstrate the appropriateness of the appeal. A student with a complaint about a grade is encouraged to first discuss the matter with the instructor. For complete details, including the responsibilities of the parties involved in the process and the number of days allowed for completing the steps in the process, see University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures. These documents are accessible through the University Rules website at [http://www.tamucc.edu/provost/university_rules/index.html](http://www.tamucc.edu/provost/university_rules/index.html), and the College of Science and Engineering Grade Appeals webpage at [http://sci.tamucc.edu/students/GradeAppeal.html](http://sci.tamucc.edu/students/GradeAppeal.html). For assistance and/or guidance in the grade appeal process, students may contact the chair or director of the appropriate department or school, the Office of the College of Science and Engineering Dean, or the Office of the Provost.

• **Disability Services**
  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 believe you have a disability requiring an accommodation, please call (361) 825-5816 or visit Disability Services in Corpus Christi Hall 116.

If you are a returning veteran and are experiencing cognitive and/or physical access issues in the classroom or on campus, please contact the Disability Services office for assistance at (361) 825-5816.
http://disabilityservices.tamucc.edu/

• **Statement of Academic Continuity**
  In the event of an unforeseen adverse event, such as a major hurricane and classes could not be held on the campus of Texas A&M University–Corpus Christi; this course would continue through the use of Blackboard and/or email. In addition, the syllabus and class activities may be modified to allow continuation of the course. Ideally, University facilities (i.e., emails, web sites, and Blackboard) will be operational within two days of the closing of the physical campus. However, students need to make certain that the course instructor has a primary and a secondary means of contacting each student.

L. **OTHER INFORMATION**

• **Academic Advising**
  The College of Science & Engineering requires that students meet with an Academic Advisor as soon as they are ready to declare a major. The Academic Advisor will set up a degree plan, which must be signed by the student, a faculty mentor, and the department chair. Meetings are by appointment only; advisors do not take walk-ins. Please call or stop by the Advising Center to check availability and schedule an appointment. The College’s Academic Advising Center is located in Center for Instruction 350 or can be reached at (361) 825-3928.

**GENERAL DISCLAIMER**

I reserve the right to modify the information, schedule, assignments, deadlines, and course policies in this syllabus if and when necessary. I will announce such changes in a timely manner during regularly scheduled lecture periods.