Foundational Approaches to Physical Science, SMTE 3315  
Department of Physical and Environmental Science  
Fall 2017

A. COURSE INFORMATION

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

B. INSTRUCTOR INFORMATION

Instructor: Sabrina Krueger  
Office: EN 201  
Office Hours: Available 30 minutes before and after class  
e-mail: Sabrina.Krueger@tamucc.edu

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  
• Basic calculator
F. **STUDENT LEARNING OUTCOMES AND ASSESSMENT**

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 online quizzes, four at-home projects, one practicum, and daily attendance points. 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/PROJECTS**
All formal homework will require a practical approach from students. Students will conduct simple experiments, grow crystals, 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. 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: mass, length, and angle) 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 in the Mechanics tab.
*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 are no 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, each containing a different variety of crystal specimens, and submit, via Blackboard, and a free format essay summarizing your procedure, observation of the crystals’ growth, and comparison of the crystals. Suggestions for crystal varieties include: salt, borax, Epsom salt, sugar, & alum. The due date, rubric, and more details are on the Bb under the Chemistry tab.
*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 covering 10 questions and answers related to a physical science topic covered in this class. Must include appropriate TEKS and grade level on the back of the board. Mazes must be functional at the beginning of class on the due date. Mazes covering topics other than physical science will not be accepted and a grade of zero (0) will be given.
*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.
*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.

Optional Practice
There will be informal homework assigned for practice and formal homework assigned for grades. The answers to all informal homework will be posted on Blackboard page in each instructional unit folder. Students must keep up with informal homework to ensure a good grade on exams.

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>% of FINAL GRADE</th>
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<tbody>
<tr>
<td>Exams</td>
<td>36</td>
</tr>
<tr>
<td>Quizzes</td>
<td>18</td>
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<tr>
<td>Homework</td>
<td>18</td>
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<tr>
<td>Practicum</td>
<td>18</td>
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<tr>
<td>Attendance</td>
<td>10</td>
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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.
# I. Course Content/Schedule

<table>
<thead>
<tr>
<th>M/W</th>
<th>T/R</th>
<th>Topics</th>
</tr>
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<tbody>
<tr>
<td>9/4</td>
<td>9/5</td>
<td>Labor Day <del>No Class</del></td>
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<tr>
<td>9/6</td>
<td>9/7</td>
<td>Introductions and expectations. The goal of “scientific literacy”</td>
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<tr>
<td>9/11</td>
<td>9/12</td>
<td>The scientific method.</td>
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<tr>
<td>9/13</td>
<td>9/14</td>
<td>Measurements and Data Collection.</td>
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<tr>
<td>9/18</td>
<td>9/19</td>
<td>Calculations and Data Analysis.</td>
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<td>9/25</td>
<td>9/26</td>
<td>Gravity.</td>
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<tr>
<td>9/27</td>
<td>9/28</td>
<td>Simple Machines</td>
</tr>
<tr>
<td>10/2</td>
<td>10/3</td>
<td>Exam I <del>Online</del>&lt;br&gt;<strong>Homework #1 due on Blackboard.</strong>&lt;br&gt;<strong>Online Quiz #1 due @ 11:59pm.</strong></td>
</tr>
<tr>
<td>10/4</td>
<td>10/5</td>
<td>The structure of Matter. Atoms and atomic particles.</td>
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<tr>
<td>10/9</td>
<td>10/10</td>
<td>Periodic Table of Elements. Elements, Compounds, Mixtures.</td>
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<tr>
<td>10/11</td>
<td>10/12</td>
<td>Physical and Chemical changes. Chemical bonds. Chemical formulas.</td>
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<tr>
<td>10/16</td>
<td>10/17</td>
<td>Acidic &amp; basic solutions. Solution testing</td>
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<tr>
<td>10/18</td>
<td>10/19</td>
<td>Properties of water. Heat and Temperature. <strong>Crystals due for HW#2</strong></td>
</tr>
<tr>
<td>10/23</td>
<td>10/24</td>
<td>Exam II <del>Online</del>&lt;br&gt;<strong>Homework #2 Report due on Blackboard.</strong>&lt;br&gt;<strong>Online Quiz #2 due @ 11:59pm.</strong></td>
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<tr>
<td>10/25</td>
<td>10/26</td>
<td>Nature of Electricity. Static Electricity.</td>
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<tr>
<td>11/1</td>
<td>11/2</td>
<td>Electrical Circuits.</td>
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<tr>
<td>11/6</td>
<td>11/7</td>
<td>Magnetism. Discussion of forms of energy.</td>
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<tr>
<td>11/13</td>
<td>11/14</td>
<td>Exam III <del>Online</del>&lt;br&gt;<strong>Online Quiz #3 due @ 11:59pm.</strong></td>
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<tr>
<td>11/15</td>
<td>11/16</td>
<td>Earth Science. Atmosphere. Weather and Climate <strong>Homework #3 due.</strong></td>
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<tr>
<td>11/29</td>
<td>11/30</td>
<td>Space Science Topics. <strong>Homework #4 due.</strong>&lt;br&gt;Solar Lab Extra Credit Due&lt;br&gt;Last day to sign up for Practicum</td>
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<tr>
<td>12/4</td>
<td>12/5</td>
<td>Exam IV <del>Online</del>&lt;br&gt;<strong>Online Quiz #4 due @ 11:59pm.</strong></td>
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**Practicum**<br>A: Dec 12: 4:30-7:00pm. B: Dec 11: 1:45-4:15pm. C: Dec 11: 4:30-7:00pm.

*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 a 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, as you will be responsible for the material.

Late Work and Make-up Exams
Due dates for all assignments, online quizzes, and exams are listed in the syllabus. If you know in advance you will be missing class on the day an assignment is due, please contact me 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/Bb message) will not be accepted. No extensions will be given for technical difficulties when submitting an online assignment/quiz/exam.

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 may 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 you will miss an exam, contact the instructor, in advance to schedule a time to take the exam early. If you miss an exam due to unexpected 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. If a rescheduled exam is missed a grade of 0 will be given and no further opportunities to make up the exam will be provided.

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.

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/](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.