Foundational Approaches to Physical Science
SMTE 3315—EN 201

Section B: Tuesday & Thursday, 2:00 – 4:00pm
Section C: Tuesday & Thursday, 4:30 – 6:30pm

INSTRUCTOR: Sabrina Krueger, MS
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1. COURSE DESCRIPTION:

Foundational Approaches to the Physical Sciences will cover topic subsets from Physics, Chemistry, Earth Science and Astronomy, such as mechanics, gravitation, thermodynamics, electromagnetism, waves, light & optics, periodic table, chemical bonding, earth's atmosphere, basic geology, ground water, the planets and stars.

2. OBJECTIVES:

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.

Student’s learning outcomes:
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.

3. REQUIRED MATERIALS:

a) “Teacher’s Guide to Physical Science” by Reid, Tissot; Kendall Hunt 2009
b) Proof of completion of the lab safety course: SMTE 0096.W01 (You will be asked to leave class, and will miss the attendance quizzes until you submit proof of completing this).

Supplemental Reading:

a) “Conceptual Physical Science” by Hewitt, Suchocki, Hewitt; Addison Wesley (any edition)
b) www.tea.state.tx.us/rules/tac/chapter112/index.html
4. INSTRUCTIONAL ACTIVITIES AND METHODS:

**GRADES:**

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

<table>
<thead>
<tr>
<th>The grade breakdown is as follows:</th>
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<tbody>
<tr>
<td>In-class tests (50 pts each)</td>
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<tr>
<td>Online tests (25 pts each)</td>
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<tr>
<td>Homework projects (25 pts each)</td>
</tr>
<tr>
<td>Practicum</td>
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<td>Attendance</td>
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<td>Total</td>
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**How to monitor your progress:**

To monitor your progress, calculate the percentage of the grade you have received. For example, 20 points on a homework assignment out of 25 possible points is an 80%. The average of all the calculated percentages is a fair approximation of where you are in class. However, notice the number of assignments and do not make a quick judgment based on a few unsuccessful/successful ones.

**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 topic covered in this class, and 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. *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.

**COURSE BINDER**
Each student will need to 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, ruled paper for assignments. Binders will be checked at random times during the semester. Students will be given a checklist about what needs to be in the notebook. 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.

**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.

**ATTENDANCE AND LATE POLICY:**
It is expected that all students will attend class regularly. 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. Due dates for all assignments and online tests are listed in the syllabus and will be listed in the calendar on the class Blackboard page. If you know you will be missing class, please contact me to make arrangements to turn in work. Late work will be accepted with a 10% per day penalty (including weekends). Work in electronic format (e-mail) will not be accepted unless prior arrangements have been made.
GENERAL PHILOSOPHY
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 be human. Therefore asking questions is strongly encouraged. If you do not wish to ask questions in class please speak with me after class, email me, or make an appointment. Also, 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.

STUDENT RESPONSIBILITY
You are responsible for all material presented in class as far as examinations and assignments are concerned. **Excused absences will not take this responsibility away.** Please ensure that you have contact information for group members so that you can find out what you missed in class.

ACADEMIC INTEGRITY/PLAGIARISM
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 grade of zero.

DROPPING A CLASS
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 me before you decide to drop to be sure it is the best thing to do. **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.** April 10, 2015 is the last day to drop a class with an automatic grade of “W” this term.

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.
GRADE APPEALS

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, and the College of Science and Engineering Grade Appeals webpage (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.

DISABILITIES ACCOMMODATIONS

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 or visit Disability Services at (361) 825-5816 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.

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.
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<tr>
<th>Date</th>
<th>Topics</th>
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<tbody>
<tr>
<td>1/22</td>
<td>Introductions and expectations. The goal of “scientific literacy”. The scientific method.</td>
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<td>1/29</td>
<td>Measurements and Data Collection. Calculations and Data Analysis.</td>
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<td>2/10</td>
<td>Simple Machines.</td>
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| 2/17 | **Exam I**  
*Homework #1 due.*  
*Online Test #1 due @ 11:59pm.* |
| 2/19 | The structure of Matter. Atoms and atomic particles. |
| 2/24 | Periodic Table of Elements. Elements, Compounds, Mixtures. |
| 2/26 | Physical and Chemical changes. |
| 3/3 | Chemical bonds. Chemical formulas. |
| 3/5 | Acidic & basic solutions. Solution testing. |
| 3/12 | **Exam II**  
*Homework #2 due.*  
*Online Test #2 due @ 11:59pm.* |
| 3/17-19 | Spring Break-No Class |
| 3/24 | Nature of Electricity. Static Electricity. |
| 3/31 | Electrical Circuits. |
| 4/2 | Magnetism. Discussion of forms of energy. |
| 4/9 | **Exam III**  
*Homework #3 due.*  
*Online test #3 due @ 11:59pm.* |
| 4/14 | Earth Science. Atmosphere. Weather and Climate |
| 4/23 | Plumbing System |
| 4/30 | Space Science Topics. |
| 5/5 | **Exam IV**  
*Homework #4 due.*  
*Online test #4 due @ 11:59pm.* |
| 5/12 | **Practicum**  
Section B: 1:45pm-4:15pm  
Section C: 4:30pm-7:00pm |