Texas A&M University - Corpus Christi - Fall 2011
Foundational Approaches to Physical Science
SMTE 3315.A01, SMTE 3315.B01, SMTE 3315.C01
A01: TR 9:30 – 11:25am; B01: MW 2:00 – 3:55pm; C01: MW 4:30 – 6:25pm

INSTRUCTOR: Mrs. Galina V. Reid, MS
OFFICE: ST 310-B
OFFICE HOURS: MTWR 12:00 – 1:00pm, and also by appointment.
PHONE: 825-3685.
E-MAIL: galina.reid@tamucc.edu

COREQUISITE: Laboratory Safety Seminar (SMTE0091). You must pass this web-based course this semester to be allowed to take SMTE 3315. Log on to your BlackBoard account to take the course.

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 and a bit about planets and stars.

2. OBJECTIVES:

The mission of SMTE 3315 is to spark interest in the eyes of students, to have students question and analyze the world around them, to have students think and to have fun, because any science exploration is fun. From other side SMTE 3315 will help the 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. TEXTBOOK:
“Teacher’s Guide to Physical Science” by Reid, Tissot; Kendall Hunt 2009

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 two in-class tests, four online tests, one course project, four homeworks, one practicum, and attendance.

Every class QUIZ will **take care of attendance** and will give you a **chance** to gain extra points as well. Every QUIZ will have one question on the material from the current class. You will gain 1 point for attendance just by participating in QUIZ. The correct answer to the question will earn you an extra point. Extra points gained through QUIZ will cover the attendance points lost because of excused absences (see attendance policy).

The grade breakdown is as follows:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>In-class tests</td>
<td>200 pts</td>
</tr>
<tr>
<td>Online tests</td>
<td>100 pts</td>
</tr>
<tr>
<td>Course Project</td>
<td>100 pts</td>
</tr>
<tr>
<td>Four homeworks</td>
<td>100 pts</td>
</tr>
<tr>
<td>Practicum</td>
<td>90 pts</td>
</tr>
<tr>
<td>Attendance</td>
<td>60 pts</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>650 pts</td>
</tr>
</tbody>
</table>

The grade ranges are:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>580 - 650</td>
</tr>
<tr>
<td>B</td>
<td>520 - 579</td>
</tr>
<tr>
<td>C</td>
<td>450 - 519</td>
</tr>
<tr>
<td>D</td>
<td>390 - 449</td>
</tr>
<tr>
<td>F</td>
<td>below 390</td>
</tr>
</tbody>
</table>

**How to monitor you progress:**

To monitor your progress calculate the percentage of the grade you have received. For example 20 points for homework out of 25 possible points is 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. Please consult me before dropping the class to make sure it is the best thing to do.

**Grade Appeals:** As stated in University Rule 13.02.99.C2, Student Grade Appeals, 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 Rule 13.02.99.C2, Student Grade Appeals, and University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures. These documents are accessible through the University Rules Web site at [http://www.tamucc.edu/provost/university_rules/index.html](http://www.tamucc.edu/provost/university_rules/index.html). For assistance and/or guidance in the grade appeal process, students may contact the Office of Student Affairs.

**Disability and Veterans’ 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 or visit Disability Services at (361) 825-5816 in Driftwood 101.

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.
ATTENDANCE AND LATE POLICY:
Although roll is not formally taken in class, it is expected that all participants with body temperatures above 90F will attend regularly. (If you are not in this category please see me.) The curriculum of this class is designed such way that the major learning comes from the actual class period. Don't afraid of being late to the class, to be late is better then to be absent. If you have to miss class due to emergency or doctor’s appointment please attend another section of SMTE3315 if possible. If not, you will loose points for attendance though some of those points can be recovered through extra points from QUIZ. If there is a reason that you must miss more than one class please talk with me to make arrangements to cover the material. Due dates for all the work for submission will be listed in the calendar on class BB page. Late work will be excepted with 10% per day penalty. Work in electronic format (e-mail) will not be excepted unless prior arrangement has been made.

ACADEMIC DISHONESTY/PLAGIARISM
No form of cheating/plagiarism will be tolerated in this class. If anyone is suspected of academic dishonesty, I will privately speak with this person in an attempt to find a solution to whatever problem is manifesting itself. If anyone is caught cheating on a given assignment/test, negative credit will be given.

GENERAL PHILOSOPHY
I believe in having fun while learning Physical Science. 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 don't wish to ask questions in class please come by my office, give me a call or make an appointment. Also, I like to talk a little about related contemporary issues in class, so if you've found an interesting newspaper clipping or watched a good documentary you'd like to share with us, please mention that. 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 are concerned. Excused absences wouldn’t take this responsibility away.

COURSE PROJECT
For the Course Project presentation “Earth Science” students will work in groups of 4. Each group chooses a topic from the list below to research and present on the day specified in the class schedule.


Each group must meet with the instructor prior to the presentation no later than September 23rd. Failing to participate in the meeting will result in negative credit. Grading rubric for the presentation will be discussed during this meeting. Each group prepares a 20 minute presentation which includes an activity. Presentations must be compact, illustrative and interactive, and include:

- An introduction and explanation of the physical science concepts involved in the topic. Your understanding of the presented material will impact your grade.
- Illustration of the topic with graphs and/or diagrams. The ability to interpret graphs and/or diagrams, to draw the conclusion from them, and make a prediction based on it will be graded.
- A class activity that illustrates the topic or a physical science principle closely related to the topic. Organization of activity will impact your grade.
- An outline of the TEKS covered by the activity and other general advice on how to introduce the topic to K-8 audiences.
**HOMEWORK**

There will be informal homeworks assigned for practice and formal homeworks assigned for grade. The answers to informal homeworks will be posted on class BB page in Learning Modules folder. Students must to keep up with informal homework to assure a good grade for the test. All formal homeworks will require practical approach from a student. Students will conduct a simple experiment, grow a crystal, make an electrical maze, and build a fountain. You must do your project by yourself. The due date for each project is indicated in the schedule below, there is 10% penalty for each extra day. There is a specific requirement for each project – read and understand it.  Each project is worth 25 points.

HW#1. *A science report.* Student will have three chances to complete an experiment and write a report. The best grade will be counted toward total grade. The topics, due dates, rubric and the instructions are on the BB under assignments.

HW#2. *Crystals of NaCl (table salt) and MgSO4 (Epsom Salt).* Research how to grow these crystals. It is not as easy as it sounds!!! There is no such thing as a perfect instruction. Do not blindly follow the instruction – use your knowledge about the matter. **It is all about the experiment.** Don’t be afraid to experiment!!! You must turn in two labeled plastic bags with crystals, one for each type of crystals and a free format one page essay summarizing your observation of the crystals’ growth. Breakdown as following: 10 for the crystals appearance and 15 for the essay. The essay must be factual not emotional.

HW#3. *An electrical maze* over the material covered in this class at 4-5 grade level. Look in the textbook for the building instructions, pg. 111-112. Attach a page with the appropriate TEKS and justification for the choice of questions. **The design and choice of questions are subjects to grade.** Breakdown: 5 point for the appearance, 10 points for the functioning (it must work!), and 10 points for the questions.

HW#4. *Fountain as a model of a plumbing system.* Use only recycled materials! Instructions for the construction will be posted on BlackBoard. No report is necessary for this HW. Breakdown: 5 point for the appearance, 15 points for the functioning (water must drain and it shouldn’t leak!).

**PRACTICUM**

At the end of the semester every student has to 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.
<table>
<thead>
<tr>
<th>Date</th>
<th>Date</th>
<th>Topics</th>
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| 24 Aug   | 25 Aug   | Introductions and expectations. The goal of “scientific literacy”.
| 29 Aug   | 30 Aug   | The scientific method.                                                |
| 31 Aug   | 1 Sept   | Measurements and Data Collection.                                      |
| 7 Sept   | 6 Sept   | Calculations and Data Analysis.                                        |
| 12 Sept  | 8 Sept   | Observing Motion. Forces. Work and Energy.                             |
| 14 Sept  | 13 Sept  | Gravity.                                                               |
| 19 Sept  | 15 Sept  | Simple Machines. *Homework #1 due.*                                    |
| 26 Sept  | 22 Sept  | Periodic Table of Elements. Elements, Compounds, Mixtures.             |
| 28 Sept  | 27 Sept  | Physical and Chemical changes.                                         |
| 3 Oct    | 29 Sept  | Chemical bonds. Chemical formulas.                                     |
| 10 Oct   | 6 Oct    | Acidic and Basic solutions. Solutions testing.                         |
| 17 Oct   | 13 Oct   |                                                                        |
| 2 Nov    | 1 Nov    | Properties of Sound. *Homework #3 due.*                                |
| 7 Nov    | 3 Nov    | Earth Science. Atmosphere.                                            |
| 9 Nov    | 8 Nov    | Earth Science. Hydrosphere.                                           |
| 21 Nov   | 17 Nov   | Weather and Climate.                                                  |
| 23 Nov   | 22 Nov   | Space Science Topics. *Homework #4 due.*                               |
| 28 Nov   | 29 Nov   |                                                                        |
| 30 Nov   | 1 Dec    | *Course Project Conference “Planet Earth”*                             |
| 5 Dec    | 6 Dec    | *Course Project Conference “Planet Earth”*                             |
|          |          |                                                                        |
|          |          | **Exams**                                                              |
|          |          |                                                                        |
|          |          | **Exam I**                                                             |
|          |          |                                                                        |
|          |          | **Exam II**                                                            |
|          |          |                                                                        |
|          |          | **Course Project Conference “Planet Earth”**                           |
|          |          |                                                                        |
|          |          | **Practicum**                                                          |
|          |          |                                                                        |
|          |          | **Final Exams**                                                        |
|          |          |                                                                        |
|          |          | **See S.A.I.L.**                                                       |
|          |          |                                                                        |