SMTE 3315.001 and SMTE 3315.101

Foundational Approaches to Physical Science, Lecture and Lab

MTWR 2:00pm – 4:55 pm

INSTRUCTOR: Nancy Long Darnell, MS

SEMESTER: Summer II- 2013

OFFICE HOURS: TWR 1:00 -- 2:00pm, ST 201

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E-MAIL: long301@yahoo.com

COURSE DESCRIPTION: Emphasis on physical science topics such as matter, energy, motion, electricity and magnetism, sound, and light. Laboratory involvement will emphasize techniques of problem solving, data gathering, and data application. The primary focus of this course is to prepare pre-service teachers to teach physical science topics in grades EC-8.


STUDENT LEARNING OUTCOMES: At the completion of the class the students will be able to:

• Use the scientific method to solve problems.

• Identify and control variables in investigations.

• Demonstrate knowledge via content tests and laboratory investigations of key concepts in the following areas of physical science:
  Electricity    Magnetism    Matter    Simple Machines    Basic Chemistry
  Weather    Heat    Air    Light    Water    Astronomy/Space    Geology

• Link physical science content to the Texas Essential Knowledge and Skills for Science grades EC-8. Download your copy of the science TEKS for grades K-8 at http://ritter.tea.state.tx.us/rules/tac/chapter112/index.html
**GRADES:** Grades will be calculated for the following assignments:

Three homework assignments @ 25 points each – 75 pts

Three online tests @ 25 points each – 75 points

Mid-Term Exam -- 150 pts

Topic Presentation -- 40 pts

Practicum -- 100 pts

Final Exam -- 200 pts

Attendance -- 60 pts

**Total -- 700 pts**

A 630 - 700
B 560 - 629
C 490 - 559
D 420 - 489
F below 420

Students with disabilities including learning disabilities, who wish to request accommodations in this class, should register early with SSD so that appropriate arrangements may be made.

**ATTENDANCE AND LATE POLICY:** Each class period is three hours long. One point will be awarded for each hour you are present in class for a total of three points per day plus three points for being present on the day of the final exam or 60 points total.

**ACADEMIC DISHONESTY/PLAGIARISM**

All students are expected to conform to college-level standards of academic integrity and quality of work (this includes spelling and grammar where applicable). Additional general guidelines that may be of interest to the student can be found in the *General Academic Policies and Regulations* section of the TAMU-CC undergraduate catalog as well as *The Student Code of Conduct*. In cases involving academic dishonesty as defined by the Student Code of Conduct such as plagiarism and cheating the Student Code of Conduct guidelines will be followed. **Except in cases where prior arrangements have been made with the instructor for university-approved absences, there is no provision for making up late work and/or missed quizzes or exams.**

**TOPIC PRESENTATION**
Students will give a 15-minute presentation on an assigned topic related to this course. The instructions, details, and grading rubric are available on the course Bb. The presentation will include an activity for teaching the subject matter to children and the TEKS associated with the topic.

**HOMEWORK**

There will be informal homeworks assigned for practice and formal homeworks assigned for a grade. The answers to informal homeworks will be posted on class Bb page in each Learning Modules folder. Students must to keep up with informal homework to assure a good grade on the test.

All formal homeworks are activity-based. Students will conduct a simple experiment, grow a crystal, and make an electrical maze. You must do your project by yourself. The due date for each project is indicated in the schedule below. **There is a 3-point penalty for each extra day.** There is a specific requirement for each project; make sure to read and understand it. Each project is worth 25 points.

**HW#1. A science report.** Student will complete a science experiment and write a report. Report will be submitted via Bb. The topic, due dates, rubric and the instructions are on the Bb under assignments.

**HW#2. Crystals of two salts [choose two from NaCl (table salt), sodium tetraborate (20 Mule Team Borax), Copper Sulfate (fungicide, snail killer) and MgSO\(_4\) (Epsom Salts)].** Research how to grow these crystals. 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 submit via Bb 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.

**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. **The design and choice of questions are part of the grade.** Submit the justification for the choice of questions via Bb. The due date, rubric and the instructions are on the Bb under assignments.

**ONLINE TESTS**

The online tests are designed to review the subject material covered in the course. Four attempts are allowed for each test, with the highest grade achieved for each test counting toward the course total.

**EXTRA CREDIT**
Although no extra credit assignments will be accepted or graded, certain assignments may contain opportunities for bonus points at the instructor’s discretion.

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 to 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.

- Make necessary measurements and calculate an average speed of a moving object.
- Make necessary measurements and identify the unknown solid material by calculated density.
- Determine the type of three unknown water solutions with use of either cabbage juice, litmus or pH paper.
- Construct a simple electrical circuit containing a battery, bulbs and a switch according to a diagram.
- 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.
- 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.
- Construct a lever system. Predict and verify how much effort is needed to lift up given weight with use of that lever system.

LABORATORY SAFETY: All students are required to take the Laboratory Safety On-line Course (SMTE-0091). To Begin go the University homepage and click on "The Island Online". Click 'Student resources' for login information. Submit the course documentation to the class instructor on the first or second day you attend class. Students will be given zeroes on all assignments until the course documentation is submitted and will be dropped from the course if it is not received within five class days.

SCHEDULE
<table>
<thead>
<tr>
<th>Date</th>
<th>Topics</th>
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<tbody>
<tr>
<td>8 July</td>
<td>Introductions and expectations; the scientific method; the 5E method&lt;br&gt;<strong>Laboratory Safety Course documentation due</strong></td>
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<tr>
<td>9 July</td>
<td>Measurements and calculations; class project: swing experiment: collect data</td>
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<tr>
<td>10 July</td>
<td>Class project - data analysis.</td>
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<tr>
<td>11 July</td>
<td>Forces, work, and energy. <strong>Homework 1 due (report)</strong></td>
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<tr>
<td>15 July</td>
<td>Simple machines</td>
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<tr>
<td>16 July</td>
<td>The structure of matter; atoms and molecules; Periodic Table of Elements.</td>
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<td>17 July</td>
<td>Physical and chemical changes; chemical bonds; elements, compounds, mixtures;</td>
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<td>18 July</td>
<td>Chemical formulas and naming chemical compounds</td>
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<td>22 July</td>
<td>Acids and bases, pH indicators; <strong>Homework 2 due (crystals)</strong></td>
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<tr>
<td>23 July</td>
<td>Properties of water</td>
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<td>24 July</td>
<td>Heat and temperature, review for mid-term exam</td>
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<td>25 July</td>
<td><strong>Mid-term exam</strong>, nature of electricity</td>
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<td>29 July</td>
<td>Static electricity, current electricity</td>
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<tr>
<td>30 July</td>
<td>Electromagnetism</td>
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<tr>
<td>31 July</td>
<td>Properties of light and sound; discussion of forms of energy; <strong>Homework 3 due (circuit maze)</strong></td>
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<td>1 August</td>
<td>Earth Science: Atmosphere and hydrosphere</td>
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<td>5 August</td>
<td>Earth Science: Lithosphere, rock cycle</td>
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<td>6 August</td>
<td>Space science topics</td>
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<td>7 August</td>
<td>Review for Final Exam, <strong>Final Exam</strong></td>
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<tr>
<td>8 August</td>
<td><strong>Lab Practicum</strong></td>
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