

**SCI 111: Physical Science**  
**Fall 2019 and Spring 2020**  
**Maine School of Science and Mathematics**

## **Class Times and Locations**

**Class** MTWR 11:15 AM–12:05 PM

**Lab** F 10:20 AM–12:05 PM

All class meetings are in room B216.

## **Lecturer**

Richard Barrans, Ph.D., M.Ed.; barransr@mssm.org

Office Hours: Sun 6:30–7:30 PM; M 10:20–11:10 AM, T 2:05–3:05 PM, W 3:10–4:05 PM.

## **Objectives**

After completion of the first semester of this course, the successful student will be able to:

- Describe the contents and structure of the solar system.
- Explain the formation of geologic features.
- Explain the forces and interactions that determine the weather and climate.
- Interpret everyday and experimental phenomena in terms of standard scientific theory.
- Explore the properties of matter by designing, conducting, and interpreting experiments,

## **Course Content and Approach**

What is the universe made of? How does it operate? What is our place in it? How can we find out? In this course, students explore these questions. Students are invited to learn not only *what* we know about the universe we live in and the earth we live on, but especially *how* we have learned it and continue to learn more. The first semester of this course is an introduction to earth and atmospheric science. The second semester is an introduction to physics and chemistry. Laboratory activities, in which students can directly observe systems, gather data, analyze authentic evidence, and draw conclusions, are a critical component of the class.

## **Textbooks**

(EC) *EarthComm*, by Carpenter and Hoover, published by It's About Time, 2012.

(IS) *Integrated Science*, Fifth Edition, by Tillery, Enger, and Ross, published by McGraw Hill, 2008.

## **Grading**

Your grade is based on completing performance standards and laboratories.

## **Standards**

Standards are skills and competencies students must complete. Each standard is a segment of the course content. Standards are basically graded pass/fail: a student demonstrates mastery or not. A student does not need to master a standard on the first try to receive full credit. To try again,

the student must have done the homework for the standard and must complete additional work, usually a revision. If this is completed in time, the student is eligible to test again at the next opportunity.

If you become ineligible to retest on a standard (by not doing the homework, not completing a revision on time, or not taking a quiz), you can become eligible to retest on the final exam by completing whatever you missed by the “close” date for the standard. If you simply missed a quiz, you need to submit a request to retest before the standard’s close date.

Each standard receives a letter score. Possible scores are

- S Satisfied
- R Not yet satisfied, ready to retake at next opportunity
- N Not yet satisfied, student needs to complete additional work to become eligible to retake
- E Not satisfied, eligible to retest only on the final
- F Not satisfied, no longer eligible for assessment

The passing score is “S.”

### ***Labs***

Each lab is scored all-or-nothing: it must be satisfactory to receive credit. If a lab is not satisfactory when turned in on time, it can receive credit if it is corrected in a timely manner. Lab grades reported online are

- C Complete (satisfactory; full credit)
- I Incomplete (turned in on time; there is still time to correct it)
- F No credit (not completed in a timely manner).

### ***Letter Grades***

#### **Interim grade estimates**

When it is necessary to estimate a student’s grade before the end of the semester, such as for Academic Updates, Progress Reports, or Academic Alerts,

- Standards that have not been tested are not counted.
- Standards that have been tested only once are given half weight.
- Standards that have been tested at least twice are given full weight.

A student’s percentage score is given by weighted standards satisfied divided by the total number of weighted standards tested. Grade estimates are assigned by the following scale:

- A+ satisfy 97% of standards and complete or make timely progress on all labs
- A satisfy 93% of standards and complete or make timely progress on all labs
- A– satisfy 90% of standards and complete or make timely progress on all labs
- B+ satisfy 87% of standards and complete or make timely progress on all labs
- B satisfy 83% of standards and complete or make timely progress on all labs
- B– satisfy 80% of standards and miss no more than 1 lab

- C+ satisfy 77% of standards and miss no more than 1 lab
- C satisfy 73% of standards and miss no more than 1 lab
- C- satisfy 70% of standards and miss no more than 1 lab

Students are expected to make timely progress on all standards and labs. Missing deadlines is a cause for concern.

### **Semester grades**

Final letter grades are determined by satisfying standards and completing labs from the semester.

- A+ satisfy 98% of standards and miss no more than 1 lab
- A satisfy 95% of standards and miss no more than 1 lab
- A- satisfy 93% of standards and miss no more than 1 lab
- B+ satisfy 91% of standards and miss no more than 1 lab
- B satisfy 88% of standards and miss no more than 1 lab
- B- satisfy 88% of standards and miss no more than 2 labs
- C+ satisfy 85% of standards and miss no more than 2 labs
- C satisfy 80% of standards and miss no more than 3 labs
- C- satisfy 75% of standards and miss no more than 4 labs

### **Year grades**

Final letter grades are determined by satisfying standards and completing labs from the entire year.

- A+ satisfy 98% of standards and miss no more than 2 labs
- A satisfy 95% of standards and miss no more than 2 labs
- A- satisfy 93% of standards and miss no more than 2 labs
- B+ satisfy 91% of standards and miss no more than 2 labs
- B satisfy 88% of standards and miss no more than 3 labs
- B- satisfy 88% of standards and miss no more than 4 labs
- C+ satisfy 85% of standards and miss no more than 5 labs
- C satisfy 80% of standards and miss no more than 6 labs
- C- satisfy 75% of standards and miss no more than 7 labs

## **Course Components**

### ***Class***

Attendance is expected at all classes. Quizzes in class may not be announced beforehand, so don't miss classes. And chances are pretty good that what I teach in class will be covered in a quiz.

### **Group Work**

Classes include work to be done in groups. This work is important to the class! Please make an effort to solve all class work problems, and to ensure that all members of your group understand each problem and solution.

## Class Groups

Student groups for class work may be assigned. New groups will form from time to time.

## Quizzes

Some quizzes may be administered in class. Subject to convenience and availability, some may be administered on-line. They must be completed in one sitting during the allotted time period. Online quizzes are open-note and open-book. Calculators are permitted. You are also permitted to access the internet during on-line quizzes.

However, any means of communication, consultation, or collaboration with any person (other than the instructor) while taking a quiz is not allowed. By way of example, and in no way intended to limit the scope of what is considered “communication,” forbidden means of communication include speech, writing, any visible sign or symbol, vocal utterances, overheard speech, sound generated by any means, gestures including sign language, Morse code, e-mail, text-messages, postings to message boards, or any other means of transferring information to another mind, whether or not known to the instructor or available at the time of publication of this syllabus. If you finish a quiz before a classmate, you may not communicate about the quiz with the classmate until they also finish.

Sharing of any materials, including textbooks, calculators, and computers, with classmates during quizzes and exams is prohibited.

## Quiz revisions

To become eligible to retest on a missed standard, you usually will need to write a revision for each quiz question you got wrong for the missed standards. Revisions explain why you submitted the wrong answer and how to find the correct answer. A detailed rubric for revisions can be found online.

## Homework

Homework problems are assigned to help you practice the material and to prepare for the quizzes. They do not count toward your course grade. However, working the homework problems will very likely maximize your performance on quizzes, which do count toward your course grade. Homeworks are graded by completion: you receive full credit if you attempt every assigned problem and the homework is submitted on time. Submit homework in hard copy by its due date.

**If you do not pass a standard when assessed the first time, you will not be allowed to test again on that standard unless you completed the corresponding homework assignment beforehand.** *There are two exceptions* per semester: Once per semester, you may retest on standards for which you did not complete the homework, and once per semester you may complete the homework between the first and second quizzes on a standard.

## Laboratories

Weekly laboratory participation is an essential component of the course.

## Lab Groups

It is expected that you will work in groups in lab. Many of the experiments require several people just to take the data. Groups may contain four or fewer students; obtain instructor permission *each time* for larger groups. All group members are responsible for completing all data tables, graphs, and analyses. Your instructor may check the data sheet of any group member to evaluate the group's work and data collection.

## Lab Grades

Labs scores are all-or-nothing. You receive credit for a lab only if all sections of the activity are satisfactory. Present your data to your instructor for approval when you leave. If any part is unsatisfactory, you may immediately fix what is wrong, or you may arrange a time to meet with your instructor *before* it is due to have the corrected part approved.

## Lab Reports

Written lab reports, if required, are due at the beginning of the next lab. Deficiencies must be corrected in a timely manner. Repeated attempts are permitted, but each attempt must be substantive and timely. Some lab reports may be submitted by an entire lab group; others must be submitted individually by each student. I will clearly communicate which is the case for each lab.

## Resources

### *Instructor*

During my listed office hours, I will be physically in my room, or I will leave a note on my desk stating where I can be found nearby (lab, main office, maker space...). You are also invited to see me in my room at other times—if the door is open, please come in.

If visiting me is inconvenient, the very best way to contact me is by e-mail. I can pretty much guarantee that I will forget any conversation in class. If I have my wits about me when you speak to me in class, I will ask you to send me an e-mail to remind me of what we discussed. If I forget, please send the e-mail anyway.

The hour immediately before a class is not a good time to contact me, because I will be concentrating on preparing for class. After class is usually better, unless I am in a hurry to tidy up before the next class.

### *Textbook*

The textbook is your first source of information. The assigned sections of the text are best read by each student before class.

### *Internet*

Course information and other resources will be posted on the class web site at [www.barransclass.com/sci111](http://www.barransclass.com/sci111). Current scores for homeworks, labs, and standards will be posted on Infinite Campus. There may be resources on Canvas, if I figure it out.

## **Absences**

Quizzes missed due to an excused absence may be made up. Arrangements for make-up quizzes must be made within seven calendar days of your return to class. If you miss a quiz or make-up quiz without an excuse, you will not be allowed any further make-ups for the covered standard(s).

If you are unable to attend a lab due to an excused absence, contact me. I may either schedule a make-up at another time or pro-rate your missed lab.

## **Academic Integrity**

### ***2019-2020 Community Handbook***

At MSSM, students and staff take great pride in academic honesty and a supportive academic environment. All are expected to maintain habits of rigorous debate, healthy inquiry, and the vigorous pursuit of truth. Academic dishonesty, in any of its forms, disrupts the learning process and tarnishes the integrity of our community. As a result, MSSM will treat instances of academic dishonesty very seriously.

If an instructor grants permission, students may collaborate in completing assignments and homework. Any unauthorized collaboration, copying, using of notes on exams/major assessments, storing of non-permitted information on calculators or on computers, or any other unacceptable activity that gives a student or a group of students advantages over others is cheating and will not be tolerated.

While the assimilation of ideas from many sources is basic to academic research and intellectual development, students must always reference the use of any non-original materials. Failure to do so is plagiarism and this dishonesty impairs an instructor's ability to accurately evaluate a student's performance. Plagiarism is using someone else's ideas, wording, or data without proper or complete acknowledgment. Credit must be given for ideas and information that belong to someone else, whether it is quoted, summarized, or paraphrased. Faculty members may require that notes, drafts, and a list of sources be submitted along with the finished project. Failure to provide evidence of the work process may constitute an admission of plagiarism.

### ***This class***

Students are expected to respect others' opinions and abilities. Those who disrupt the class or interfere with other students' opportunity to learn will be asked to leave the class. If you have a mobile phone or any other distracting equipment, turn it off or silence it and refrain from non-class use during class.

Students are expected to work together on group work and labs, and encouraged to study together. However, all submissions must represent your OWN work. Copying, collaborating, and sharing of materials during quizzes is not permitted, as described in detail above. Other prohibited practices include, but are not limited to, signing an absent student's name to a sign-in sheet, submitting material for grading that is also submitted to another class without clearance by both instructors, and "dry-labbing" or recording data in lab that you did not actually observe.

You are far better off learning physics than pretending to. Physics is fun. Involvement in a case of academic misconduct is not.

## **Notice of Non-Discrimination**

MSSM does not discriminate on the basis of race, color, national origin, sex, disability, or age in its programs and activities. The following person has been designated to handle inquiries regarding the non-discrimination policies:

- Marie Beckum, Business Manager/Human Resource Officer/ Title IX Coordinator
- 95 High Street, Limestone, ME
- 207-554-9918

For further information on notice of non-discrimination, visit <http://wdcrobcolp01.ed.gov/CFAPPS/OCR/contactus.cfm> for the address and phone number of the office that serves your area, or call 1-800-421-3481

## **Disclaimer**

Information in the syllabus was, to the best of the instructor's knowledge, correct when distributed at the beginning of the term. However, the instructor reserves the right to make changes in the course content or instructional techniques during the term. If any changes to the syllabus become necessary, students will be notified orally in class and by e-mail.

## Tentative Schedule

Week of	Reading and Topics	Notes
Aug 19	EC §1.1–1.5: Sun-earth-moon system; Solar system.	
Aug 26	No reading. Maps.	
Sep 2	IS 361–367: Rivers	
Sep 9	IS 367–368: Glaciers, sea coasts.	
Sep 16	IS 369–370. Wind. EC §3.1: Minerals.	Break; classes resume Sep 18.
Sep 23	EC §3.3: Sedimentary rocks.	Standards close Sep. 27.
Sep 30	EC §3.2: Igneous rocks. EC §2.7–2.8: Volcanoes.	
Oct 7	EC §3.3–3.7: Rock units. Geologic maps. Geologic time scale.	
Oct 14	EC 2.1–2.5: Plate tectonics. IS 525–533: Radioactive dating.	
Oct 21	EC §3.7–3.8: Geologic history of Earth and Maine.	Break; classes resume Oct 23. Standards close Oct 25.
Oct 28	IS 373–389: Atmospheric energy, thunderstorms, tornadoes.	
Nov 4	IS 389–397: Cyclones.	
Nov 11	IS 398–399: Weather forecasting. IS 399–403: Climate types.	
Nov 18	IS 403–408: Climate science. Global warming.	Standards close Nov. 22.
Nov 25	none	<b>Break</b>
Dec 2	Past climate changes.	
Dec 9	Final exam TBA	Final exam week

<b>Week of</b>	<b>Reading and Topics</b>	<b>Notes</b>
Jan 20	IS 25–30: Motion. Describing motion.	Compressed schedule Jan 23
Jan 27	IS 30–41: Force and motion.	
Feb 3	IS 42–51: Momentum. Gravity.	Late start Monday. Standards close Feb. 7.
Feb 10	IS 55–66: Work and energy.	
Feb 17	none	<b>Break</b>
Feb 24	IS 75–93: Heat and temperature.	
Mar 2	IS 94–98: Thermodynamics. Heat engines.	Standards close Mar. 6.
Mar 9	IS Ch. 5: Vibrations, waves, and sound.	
Mar 16	IS Ch. 6: Electricity and magnetism.	
Mar 23	IS Ch. 7: Light and optics.	Break; classes resume Mar 25.
Mar 30	IS Ch. 8: Atoms and orbitals. Periodic table.	Standards close Apr. 3.
Apr 6	IS 196–211: Structure of covalent compounds.	
Apr 13	IS 212–213: Balancing equations. Equilibrium.	
Apr 20	none	<b>Break</b>
Apr 27	IS 213–215: Chemical reactions: redox and precipitation.	Standards close May 1.
May 4	IS Ch.10: Chemical reactions: acids and bases.	
May 11	IS Ch. 11: Nuclear reactions.	
May 18	Final Exam TBA	Final exam week