

Syllabus
SCI 111, Physical Science
Maine School of Science and Mathematics, Fall and Spring Semesters 2018–2019

Class Times and Locations

Class MTWR 11:30 AM–12:25 PM **Lab** W 1:30–3:25 PM

All class meetings are in room B216.

Lecturer

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

Office Hours: M 9:30–10:30 AM, T 1:30–2:30 PM, R 2:30–3:30 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

How does the world work? What is it 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, and analyze authentic evidence, and draw conclusions, are a critical component of the class.

Textbooks

Fall semester: *EarthComm*, by Carpenter and Hoover, published by It's About Time, 2012.

Spring semester: *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

Exercises won't receive numerical scores; instead, each standard assessed receives a letter indication. Possible letters are

- F Not satisfied, no longer eligible for assessment
- E Not yet satisfied, still eligible for assessment
- P Progressing toward satisfactory, but the standard has not been fully covered.
- S Satisfactory

The only passing indicator is “S.”

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 labs that are not complete. Missing deadlines for resubmission is a cause for concern and will be reported accordingly.

Semester

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

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

Assessments

Quizzes and exams assess your performance on one or more standards. If many students do not satisfy a standard when it is assessed, it may be assessed again in a later whole-class assessment. There will also be opportunities for students to retest on standards for which their score is “E”. For an “E” rather than “F”, you must complete on time all assignments and exercises for that standard, and you must work toward fulfilling the standard in a timely manner.

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

Lectures will 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.

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.

Lab Reports

Written lab reports, if required, are due at the beginning of the next lab. Deficiencies must be corrected within one week after the graded reports are returned to the students. Repeated attempts are permitted, but each attempt must be substantive, not a sham to get more time. 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.

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.

Homework, Drills, and Practice

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 these problems will very likely maximize your quiz scores, which do count toward your course grade.

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. All quizzes will be 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, 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.

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. 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.

Ethical Expectations

Students are expected to respect others' opinions and abilities, and to help each other during group work, discussion, and laboratory. 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.

Academic honesty develops respect between faculty and students, ensures fair and effective grading, and creates an environment that fosters learning. Students are expected to work together on group work and labs, and encouraged to study together. However, all submissions must represent your OWN work.

Academic dishonesty is forbidden. Academic dishonesty primarily involves a student representing another's work as his own or assisting another student to represent another's work as his own. This includes, but is 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, "dry-labbing" or recording data in lab that you did not actually observe, submitting material created by another without proper attribution, and receiving or giving assistance on evaluations.

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 20	§1.1–1.x: Sun-earth-moon system; Solar system.	
Aug 27	Plate tectonics.	
Sep 3	Volcanoes.	
Sep 10	Earthquakes.	
Sep 17	Rocks and minerals.	Break; resume Sep 19
Sep 24	Rocks and minerals.	
Oct 1	Structural geology; geologic history.	
Oct 8	Water cycle, rivers, land use.	
Oct 15	Ice, wind, and coasts.	
Oct 22	Geology of Maine.	Break; resume Oct 24
Oct 29	Atmospheric energy, thunderstorms, tornadoes.	
Nov 5	cyclones, climate types.	
Nov 12	Climate change.	
Nov 19	none	break
Nov 26	Earth's resources.	
Dec 3	Earth's history.	
Dec 10	Final exam TBA	Final exam week

Week of	Reading and Topics	Notes
Jan 21	Force and motion.	Compressed schedule Jan 24
Jan 28	Momentum, changing direction, gravity.	
Feb 4	Work and energy.	Late start Monday
Feb 11	Heat and temperature.	
Feb 18	none	break
Feb 25	Thermodynamics.	
Mar 4	Vibrations, waves, and sound.	
Mar 11	Electricity and magnetism.	
Mar 18	Generating electricity.	Break; resume Mar 20
Mar 25	Light and optics.	
Apr 1	Atoms and electron orbitals.	
Apr 8	Chemical compounds.	
Apr 15	none	Break
Apr 22	Chemical reactions.	
Apr 29	Chemical reactions.	
May 6	Atomic nuclei and radioactivity .	
May 13	Fission and fusion.	
May 20	Final Exam TBA	Final exam week