SCI 111: Physical Science
Spring 2022
Maine School of Science and Mathematics

Class Meetings

Class Blue days 11:00 AM–12:20 PM **Lab** Tuesday 1:30 PM–3:30 PM

Location room B216.

Instructor

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

Office Hours Sun 6:30–7:30 PM; Blue MTRF 9:30–10:30 AM; Blue W 8:00–9:00 AM; Gold M 2:30–3:30

Objectives

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

- 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

The second semester of this course 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.

Textbook

Integrated Science, Fifth Edition, by Tillery, Enger, and Ross, published by McGraw Hill, 2008.

Grading

Your year grade will be the average of your grades from the first and second semesters.

Your grade for the second semester is determined from your scores on the different course components.

Exams	30%
Laboratories	30%
Homework	20%
Quizzes	10%
Class work	5%
Discussion	5%

A note about grades: Your grade for this class is the result of a limited set of assessments over a fifteen-week interval. It is not a declaration of your potential or of what I think of you. Do not cause yourself anxiety by making more of your grade than it is.

Exams

There will be two one-hour exams during the semester. During finals week, there will be a two-hour final in two parts, graded as separate exams. One will be the third exam in the sequence, and the second will be comprehensive. The lowest exam score will be dropped.

Laboratories

Labs are graded based on what you do in lab and how you report it. Most labs are hands-on activities conducted in groups. Safety and safe conduct are of paramount importance.

Lab Reports

Written lab reports, if required, are due at the beginning of the next lab. 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.

Homework

Homework is assigned approximately every other class meeting. Each homework is graded in two parts: the rough draft and the final draft. It is due in two parts. The rough draft, worth half of the total, is due at the next class meeting. This rough draft is graded on whether you have made an earnest effort to tackle the problems. You will receive feedback on your work, and the class as a whole may receive collective feedback in class.
The final version is also worth half of the total. The most important part is explaining how to approach and answer the question. is due after you receive the feedback on the rough draft.

Quizzes

There will be a brief quiz on or near blue Thursdays. Quizzes assess your mastery of recent topics and give examples of the types of problems that may be posed on exams.

Class work

Participation during class in work sheets and other activities outside of labs..

Discussion

Each week you will post about something good in your life, you will post about a connection you found between course material and the world outside this class, and you will respond to someone else's post.

Expectations

Class

Attendance is expected at all classes. Chances are pretty good that what I teach in class will be covered in a quiz.

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 without an excuse, you cannot make it up.

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.

Laboratories

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 record of any group member to evaluate the group's work and data collection.

Resources

Contacting the 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, …). 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

Current scores for projects, homeworks, labs, etc. will be posted on Infinite Campus. Assignments will be posted to Canvas, and many of them will be submitted to me through Canvas. I may post supplementary resources on Canvas.

Academic Integrity

2021-2022 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.

Disclaimer

Information in the syllabus was, to the best of the instructor's knowledge, correct when distributed at the beginning of the term. However, if extraordinary circumstances require changes to instructional techniques or grading procedures during the term, students will be notified in class and by e-mail.

Notice of Non-Discrimination

MSSM does not discriminate on the basis of race, color, sex, sexual orientation, gender identity or expression, religion, ancestry, national origin, genetic information, or disability in its programs and activities. The following person has been designated to handle inquiries regarding the non-discrimination policies:

- Dr Greg Hamlin (he/him/his)
- Title IX Coordinator, Affirmative Action Officer
- Email: hamling@mssm.org
- Cell: 1-413-370-4769

For further information on notice of non-discrimination you may contact the U.S. Department of Health and Human Services, Office for Civil Rights. Web: https://www.hhs.gov/ocr/index.html, Phone: 1-800-368-1019, Email: OCRMail@hhs.gov, TDD: 1-800-537-7697.

Tentative Schedule

Day	Topic	Reading	Homework*	Quiz
M 1/24	Units, conversions			
T 1/25	*Lab 16: Measurement*			
W 1/26	Working with units	1–12	HW 15 ↑	
F 1/28	Nature of science	12–20	HW 15 R ↓	
T 2/1	Velocity and acceleration	25–29	HW 16 ↑	
T 2/1	*Lab 17: Velocity and acceleration*			
R 2/3	Force	30–34	HW 16 R ↓, HW 15 F ↓	7
T 2/8	Newton's laws of motion	34–43	HW 17 ↑	
T 2/8	*Lab 18: Force and motion*			
R 2/10	Momentum	43	HW 17 R ↓, HW 16 F ↓	8
M 2/14	Conservation of momentum; circular motion	44–46	HW 18 ↑	
T 2/15	*Lab 19: Momentum*			
W 2/16	Gravity and orbits	46–51	HW 18 R ↓, HW 17 F ↓	
F 2/18	**Exam 1**			
2/19–2/28	**Break**			
T 3/1	Work and power	55–58	HW 19 ↑	
T 3/1	*Lab 20: Work*			
R 3/3	Energy	59–61	HW 19 R ↓, HW 18 F ↓	9
M 3/7	Conversion and conservation of energy	62–71	HW 20 ↑	
T 3/8	*Lab 21: Energy conversions*			
W 3/9	Kinetic molecular theory	75–78	HW 20 R ↓, HW 19 F ↓	
F 3/11	Heat and temperature	79–88	HW 21 ↑	
T 3/15	Thermodynamics	94–96	HW 21 R ↓, HW 20 F ↓	
T 3/15	*Lab 22: Drinking birds*			
R 3/17	Vibrations	103–106		10
M 3/21	**Break**, no Tuesday lab			
W 3/23	Waves and sound	106–111	HW 22 ↑	
F 3/25	Electric charge	125–129	HW 22 R ↓, HW 21 F ↓	
T 3/29	Current and circuits	129–137	HW 23 ↑	
T 3/29	*Lab 23: Waves and sound*			
R 3/31	Magnets and electromagnets	137–142	HW 23 R ↓, HW 22 F ↓	11
M 4/4	Light waves	152–167	HW 24 ↑	

Day	Topic	Reading	Homework*	Quiz
T 4/5	*Lab 24: Electric circuits*		HW 24 R ↓, HW 23 F ↓	
W 4/6	**Exam 2**			
F 4/8	Atomic structure	178–187	HW 25 ↑	
T 4/12	Elements and periodic properties	187–193	HW 25 R ↓, HW 24 F ↓	
T 4/12	*Lab 25: Types of substances*			
R 4/14	Structure of matter	196–201		12
4/16–4/24	**Break**			
M 4/25	Chemical bonding	201–206	HW 26 ↑	
T 4/26	*Lab 26: Definite proportions*			
W 4/27	Chemical formulas and names	207–211	HW 26 R ↓, HW 25 F ↓	
F 4/29	Chemical reaction equations	212–213	HW 27 ↑	
T 5/3	Balancing equations	212	HW 27 R ↓, HW 26 F ↓	
T 5/3	*Lab 27: Chemical reactions*			
R 5/5	Chemical reactions	213–216	HW 28 ↑	13
M 5/9	Water	222–230	HW 28 R ↓, HW 27 F ↓	
T 5/10	*Lab 28: Water*			
W 5/11	Acids and bases	230–237	HW 29 ↑	
F 5/13	Radioactivity	240–248	HW 29 R ↓, HW 28 F ↓	
T 5/17	Radiation exposure and detection	248–250		14
T 5/17	*Lab 29: Radioactivity*			
R 5/19	Nuclear reactions	250–259	HW 29 F ↓	
Finals week		**Final Exam (Exams 3 & 4)**		

* R = rough draft, F = final draft; ↑ = assigned; ↓ = due.