

University of Montana

ScholarWorks at University of Montana

University of Montana Course Syllabi

Open Educational Resources (OER)

Fall 9-1-2021

GEO 224N.00: General Science - Physics and Geoscience

Natalie Bursztyn

University of Montana, Missoula, natalie.bursztyn@umontana.edu

Follow this and additional works at: <https://scholarworks.umt.edu/syllabi>

Let us know how access to this document benefits you.

Recommended Citation

Bursztyn, Natalie, "GEO 224N.00: General Science - Physics and Geoscience" (2021). *University of Montana Course Syllabi*. 12355.

<https://scholarworks.umt.edu/syllabi/12355>

This Syllabus is brought to you for free and open access by the Open Educational Resources (OER) at ScholarWorks at University of Montana. It has been accepted for inclusion in University of Montana Course Syllabi by an authorized administrator of ScholarWorks at University of Montana. For more information, please contact scholarworks@mso.umt.edu.

Geo 224N – Gen Science: Phys & Geoscience | Fall 2021

Contact information

Professor: Dr. Natalie Bursztyn

Office: SC367

Class: Clapp 131 MWF 2:00-2:50 pm

Email: natalie.bursztyn@umontana.edu

Office hours: MWF 10:30-11:30 am. Please do not hesitate to contact me to set up a meeting at another time

Course Description:

This course will introduce basic principles of the physical sciences, including fundamental topics in physics, astronomy, and Earth sciences. A major focus of the course will be on building confidence in science, inspiring scientific curiosity, and preparing students to incorporate current science education standards in their future K-8 classrooms. Specific topics that we will explore include the scientific method, the physics of motion, force, and energy. We will also cover the four main components of the Earth system, the history and evolution of the Earth as a planet, the ways in which humans use resources and affect our planet, and our planet's place in the Solar System and Universe.

Lecture and Labs:

Lecture: MWF; 2-2:50 PM CHCB 131

Labs: TR in CHCB 348 with Teaching Assistants as follows

	Tuesday	Thursday
8:00-9:50 am	TA: Maeve	TA: Maeve
10:00-11:50 am	TA: David	TA: David
1-2:50 pm	TA: David	TA: Maeve

Teaching Assistants:

Maeve Sherry | maeve.sherry@umconnect.umn.edu | Masters student in Geosciences

David Baude | david.baude@umconnect.umn.edu | Masters student in Geosciences

Learning Outcomes:

By the end of the course, students should be able to:

1. Describe the motion of an object in terms of position, speed, velocity, and acceleration
2. Apply the scientific method to ask questions and conduct basic scientific experiments
3. Explain and provide conceptual examples to illustrate Newton's Laws of Motion
4. Differentiate between kinematic and potential energy, and discuss methods of energy transfer
5. Describe the interior structure of the Earth and the physical processes that shape its surface
6. Summarize the roles that human communities play in the evolution of our planet
7. Characterize Earth's place in the Solar System and Universe
8. Appreciate the impact of science on society and discover ways to inspire the next generation of scientists!

Textbook(s):

Conceptual Physical Science, 6th Ed., Hewitt, P.G., Suchocki, J.A., & Hewitt, L.A. 2017, Pearson. Moodle. I believe that the 5th ed. will be just fine, the table of contents is nearly identical.

Exploring the Changing World, Bauer, Brook, 2020

Bad Future, Better Future, Rosen, Julia, 2021

Important Dates:

UM Office of the Registrar: <https://www.umt.edu/registrar/calendar.php>

Time Management:

The standard expectation for college courses is that two hours outside of class will be required for every one credit hour in class. As a 5-credit course, you should therefore expect to spend an average of 15 hours/week on lectures, labs, homework, readings, exams, and other course activities. Please ensure that you have sufficient time to devote to this course before enrolling.

Course Calendar*:

* Subject to change: We will try to stick to the schedule as best as possible, but may need to adjust from time to time.

Intended Lecture Topics, Tests, & Reading Schedule

Wk	Topic	Reading	Tests	Notes
1	Introduction to the Physical Sciences	Prologue; <i>Bauer, B. 2020</i>		
2	Solar System & Space	Ch. 26.2 - 26.4		Sept. 6 Labor Day
3	Atoms & Minerals	Ch. 12.1, 12.3, 12.5, 20.2 - 20.3		
4	Scientific Theories pt 1	Duschl & Bybee, Ch. 26.5		
5	Scientific Theories pt 2	Ch. 26.1, 28.1, 21.3-21.7	ConceptTest 1	
6	Density, Earth's Interior	Ch. 5, 20.7, 21.2		
7	Sed. Rocks & Geologic Time	Ch. 20.8, 22.4-22.5, 23.1-23.3		Prof @ GSA Oct. 10-13
8	Structure of the Ocean & Atmosphere	Ch. 24.1-24.2, 24.3-24.7		
9	Waves: Sound & Light	Ch. 10 & 11		Prof @ TIDeS Oct. 24-27
10	Waves: Water & Seismic	Ch. 24.3, 21.1	ConceptTest 2	
11	Physics of Motion	Ch. 1.1-1.9		
12	Acceleration & Gravity	Ch. 1.10, 4		
13	Forces & Newton's Laws	Ch. 2		Nov. 24-26 Thanksgiving
14	Energy & Earth's Systems	Ch. 3.4, 3.6, 3.9, 25		
15	Resources & Sustainability	Ch. 16.6-16.7, <i>Rosen, J. 2021</i>	ConceptTest 3	
16	Final Exam			

Intended Labs and Assignments Schedule

Wk	Tuesday Lab	Thursday Lab	Assignments Due
1	Intro to TAs, intro survey (no lab)	Bubbles	1 lab & reflection 1
2	Planetarium	Solar System to Scale	2 labs & reflection 2
3	Atoms	Minerals	2 labs & reflection 3
4	Tape	Phases of the Moon	2 labs & reflection 4
5	Nebular Hypothesis	Plate Tectonics	2 labs
6	Density	Layers of the Earth	2 labs & reflection 5
7	Stream Table	Field Trip	2 labs & reflection 6
8	Ocean Stratification & Circulation	Air Pressure & Atmosphere	2 labs & reflection 7
9	Sound Waves	What is Light?	2 labs & reflection 8
10	Water Waves	Seismic Waves	2 labs
11	Position & Velocity	<i>Veteran's Day – no lab</i>	1 lab & reflection 9
12	Acceleration	Gravity	2 labs & reflection 10
13	Forces	<i>Thanksgiving – no lab</i>	1 lab & reflection 11
14	TBD – Energy Cycles?	TBD – Environment?	2 labs & lesson plan
15	Lesson plan presentations		Final reflection (#12)
16	No Lab: Final Exam		

Required assignments and exams:

1. Readings: You are expected to complete textbook and other assigned readings as you work through the course, ideally before the lectures in order to participate in active discussion
2. Lesson plan project (15%); create a lesson plan on a physical science topic of interest
3. Reflection journal (15%); following prompts, submit weekly reflections
4. Labs (20%); 2 labs/week
5. ConcepTests (30%); 3 tests, worth 10% each.
6. Final exam (20%); comprehensive, covering all units

Course guidelines and policies:

Student conduct code

All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University. All students need to be familiar with the **Student Conduct Code**: <https://www.umt.edu/safety/policies/default.php>

Attendance

Regular participation in all course exercises is expected. If you need to miss class activities (e.g. due to illness or extenuating circumstances), then please inform me in advance.

Course withdrawal

Please refer to Institute policy on adding, dropping, and withdrawing from courses: <https://www.umt.edu/registrar/students/dropadd.php>

Important dates and deadlines are provided by the Office of the Registrar: <https://www.umt.edu/registrar/calendar.php>

Disability modifications

The University of Montana assures equal access to instruction through collaboration between students with disabilities, instructors, and the [Office for Disability Equity \(ODE\)](#). If you anticipate or experience barriers based on disability, please contact the ODE at 406.243.2243, ode@umontana.edu for more information. Retroactive accommodation requests will not be honored, so please, do not delay. As your instructor, I will work with you and the ODE to implement an effective accommodation, and you are welcome to contact me privately if you wish.

Assignment expectations

Readings, homework, labs, projects, exams and other course activities are expected to be completed thoughtfully and on time.

Honor Code: "No member of the community shall take unfair advantage of any other member of the community." (Caltech)

Plagiarism: Reproducing the work of someone else, and representing the work as your own, without appropriate citation and attribution is forbidden. Plagiarism extends beyond tangible material to also include ideas. When in doubt, cite.

Collaboration: Although you are welcome and encouraged to discuss course materials, it is expected that you submit your own work that reflects your own understanding of the material. Please respect and uphold the Honor Code.

Grading policy

This course must be taken for a traditional letter grade to meet the Natural Sciences General Education requirement. A minimum final grade of C- is required to meet the Gen Ed requirement. The following grading scale may be adjusted at my discretion.

A	A 94-100%	Outstanding	Your work was exceptional : you have mastered the material. You consistently demonstrated an excellent understanding of all aspects of the course. You went above and beyond the requested outputs and offered unique insights and ideas. Your work exceeds my expectations for what I believe a student should demonstrate.
	A- 90-93%		
B	B+ 87-89%	Good to very good	You have grasped the material . Your work was complete, clear and understandable, and you consistently showed a strong understanding of the material. Your work meets my expectations for what I want students to take away from this course.
	B 83-86%		
	B- 80-82%		
C	C+ 77-79%	Satisfactory	You completed the material . You were able to grasp the majority of the concepts in the course; and demonstrated some ability to apply those concepts.
	C 73-76%		
	C- 70-72%		
D	D+ 67-69%	Barely satisfactory	Your work in the class was barely acceptable . Either you failed to complete some assignments, or your grasp of the course material was weak and incomplete.
	D 63-66%		
	D- 60-62%		
F	59% or less	Unsatisfactory	Your work was unacceptable . You did not learn the material.

Cultural leave policy

Cultural or ceremonial leave allows excused absences for cultural, religious, and ceremonial purposes to meet the student's customs and traditions or to participate in related activities. To receive an authorized absence for a cultural, religious or ceremonial event the student or their advisor (proxy) must submit a formal written request to the instructor. This must include a brief description (with inclusive dates) of the cultural event or ceremony and the importance of the student's attendance or participation. Authorization for the absence is subject to approval by the instructor. Appeals may be made to the Chair, Dean or Provost. The excused absence or leave may not exceed five academic calendar days (not including weekends or holidays). Students remain responsible for completion or make-up of assignments as defined in the syllabus, at the discretion of the instructor.

Additional information and resources

Student Academic Resources

Disability Services for Students (DSS): <http://www.umt.edu/dss/>
The Writing Center: <http://www.umt.edu/writingcenter/>
Office for Student Success: <http://www.umt.edu/oss/>
Career Services: <http://www.umt.edu/career/>
Mansfield Library: <http://www.lib.umt.edu>

Student Health and Wellbeing

Curry Health Center (mental health, physical health, pharmacy, health promotion):
<http://www.umt.edu/curry-health-center/>
Campus Recreation: <http://www.umt.edu/crec/>
DiverseU: <http://www.umt.edu/diverseu/>
Student Activity Groups: http://www.umt.edu/asum/student_groups/