

University of Montana

ScholarWorks at University of Montana

University of Montana Course Syllabi, 2021-2025

Spring 2-1-2022

PHSX 105N.50: Fundamentals of Physical Science

Ashley L. Preston

University of Montana, Missoula, ashley.preston@umontana.edu

Follow this and additional works at: <https://scholarworks.umt.edu/syllabi2021-2025>

Let us know how access to this document benefits you.

Recommended Citation

Preston, Ashley L., "PHSX 105N.50: Fundamentals of Physical Science" (2022). *University of Montana Course Syllabi, 2021-2025*. 41.

<https://scholarworks.umt.edu/syllabi2021-2025/41>

This Syllabus is brought to you for free and open access by ScholarWorks at University of Montana. It has been accepted for inclusion in University of Montana Course Syllabi, 2021-2025 by an authorized administrator of ScholarWorks at University of Montana. For more information, please contact scholarworks@mso.umt.edu.

Fundamentals of Physical Science

PHSX105N

COURSE SYLLABUS

Course Rubric and Title:	PHSX105N Fundamentals of Physical Science
Meeting times/location:	Fully online
Semester Credits:	3
Professor:	Ashley Preston
Office:	MC405, Missoula College
Email:	ashley.preston@umontana.edu
Office Hours:	TuTh 10:30 – 11:30; or by appointment

Course Description: PHSX105N Fundamentals of Physical Science, 3cr. Offered every term. Introduces the basic principles of physics, chemistry, and nuclear reactions with emphasis on the scientific method and process. Topics include scientific process; motion; work and energy; heat and temperature; and waves (sound and light); atomic structure; the periodic table of elements; chemical bonding and nomenclature; chemical formulas and equations; solutions; organic chemistry; structure and nature of atomic nucleus. Knowledge of basic algebraic functions, decimals, and scientific notation is recommended. Suitable for students with little science background.

Course Overview: The course introduces the scientific method as a tool for understanding natural phenomena. The course begins by introducing students to the methods of observation, data collection, experimentation, validation, interpretation, and theory building. Science is presented as an ongoing process that aims to construct a seamless web of knowledge about the workings of the world and the universe as a whole. PSHX105N takes an integrated approach to presenting basic concepts and principles in physics, chemistry, and nuclear reactions. Topics include mechanics, energy and thermodynamics, electricity and magnetism, waves and electromagnetic radiation, the structure of the atom, basic chemistry, organic chemistry, and the atomic nucleus. The course emphasizes connections between the branches of science, focusing on real-world situations and applications.

Required Text: Tillery, Bill. 2020. *Physical Science*, 12th edition. McGraw-Hill Higher Education. ISBN: 9781260150544. All other required readings found in Moodle.

Student Learning Outcomes: Upon completion of this course, the student will be able to:

1. Understand and critically evaluate the merit of scientific claims and/or findings encountered in education, the workplace, the marketplace, or the media;
2. Identify and differentiate between observations, hypotheses, theories, and laws;
3. Recognize patterns in natural processes and structures; formulate and test elementary predictions based on pattern recognition; draw conclusions and construct hypotheses and/or theories.
4. Interpret and do simple calculations using Newton's laws of motion;
5. Understand force, momentum, and impulse how they differ from one another;
6. Understand gravity; apply and interpret the meaning of Newton's universal law of gravitation;
7. Understand energy, work, and power; identify the different methods by which energy is converted from one form to another; and perform basic calculation;
8. Distinguish between heat and temperature; describe the methods of heat transfer; and, interpret and apply the simplified laws of thermodynamics;
9. Understand the relationship between electricity and magnetism and apply the basic laws of electricity and magnetism;
10. Understand and describe the nature of wave energy (light and sound);

11. Explain and understand the structure and behavior of atoms, molecules, compounds, elements;
12. Know the properties of water and solutions, of acids and bases;
13. Understand the structure and behavior of rudimentary organic compounds;
14. Understand basic nuclear structure and reactions.

Upon completion of a Natural Science general-education course, the student will be able to

- Understand the general principles associated with the discipline(s) studied;
- Understand the methodology and activities scientists use to gather, validate and interpret data related to natural processes;
- Detect patterns, draw conclusions, develop conjectures and hypotheses, and test them by appropriate means and experiments;
- Understand how scientific laws and theories are verified by quantitative measurement, scientific observation, and logical/critical reasoning;
- Understand the means by which analytic uncertainty is quantified and expressed in the natural sciences

Assessment Methods and Grading

This class is offered for traditional letter grade only; it is not offered under the credit/no credit option.

1. **Chapter Quizzes (13)**

Note: **Quizzes cannot be made up** without prior approval. You must contact me **in advance** of the quiz date to arrange to take the quiz prior to the regularly scheduled time. You will receive a 0 for any quiz not completed on time.

2. **Assignments (variable)**

Note: **Late assignments are not accepted.** You will receive a 0 for any assignment not submitted by the due date and time.

3. **Final Exam/Reflection.**

Note: **This exam/reflection cannot be made up** without prior approval. You must contact me **in advance** of the exam date to arrange to take the exam prior to the regularly scheduled time.

4. **Attendance/participation**

For **online** students, participation is measured by the frequency and quality of contributions to the Discussion Forum (quantity will not replace quality; consult the grading rubric for details), and timely completion of ALL work.

5. **Point distribution:**

Chapter Quizzes (13@50 pts. each) (drop 1 lowest score)	600 points	60%
Homework/Assignments (11@25 pts. each) (drop 1 lowest score)		
(2 @50 pts each)	350 points	35%
Final Exam/Reflection	50 points	5%
	1000 points	100%

Grading Scale

Please note: I do not round up—the first two numbers of your grade are your grade. Check Moodle often to keep track of your grades.

A- = 90 – 92.99; A = 93 - 100;

B- = 80 – 82.99; B = 83 – 86.99; B+ = 87 – 89.99

C- = 70 – 72.99; C = 73 – 76.99; C+ = 77 – 79.99

D- = 60 – 62.99; D = 63 – 66.99; D+ = 67 – 69.99

F = 59.99 and below

Topical Outline

Scientific Method and Process	Motion	Energy	Heat and Temperature
Wave Motion and Sounds	Electricity	Light	Atoms and Periodic Properties
Chemical Bonds and Reactions	Water and Solutions	Organic Chemistry	Nuclear Reaction

Course Accommodations Statement (DSS)

Students with disabilities may request reasonable modifications by contacting me. The University of Montana assures equal access to instruction through collaboration between students with disabilities, instructors, and [Disability Services for Students \[DSS\]](#). “Reasonable” means the University permits no fundamental alterations of academic standards or retroactive modifications. If you think you may have a disability adversely affecting your academic performance, and you have not already registered with DSS, please contact DSS in Lommasson 154, call 243-2243 (voice/TDD), or see <http://www.umt.edu/dss/>. I will work with you and DSS to provide an appropriate modification.

Make an appointment or stop by (via Zoom) during office hours to talk about your accommodations and how to use them for this course. If you plan on using an accommodation for an assignment, you must let me know in advance. I will do my best to grant the accommodation if it does not undermine the objectives of the assignment. However, you must contact me prior to the due date—even better, prior to the start of the assignment—to let me know if you will need to use an accommodation that allows for an extension on the deadline. I cannot grant a deadline extension retroactively.

Important Dates and Deadlines (Registrar’s Office)

Click on <https://www.umt.edu/registrar/calendar.php> to see the calendar for important dates and deadlines about adding, dropping, payment, withdrawals, etc.

Student Conduct Code

In an effort to ensure that students are informed about the consequences of academic misconduct, the Academic Officers of The University of Montana have determined that the following statement must be present on every course syllabus. You will be held to these standards in this course.

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](#).

Plagiarism will not be tolerated. The U of M’s student Conduct Code defines plagiarism as “Representing another person’s words, ideas, data, or materials as one’s own or the student’s own previous work as if it were the student’s own original work.” Students may be asked for their research or sources at any time. Plagiarism will be handled in strict accordance with the University of Montana Student Conduct Code.

Email policy at UM

According to the University email policy effective on 1 July 2007, an “employee must use *only* UMM assigned student email accounts for all email exchanges with students, since such communication typically involves private student information.” This means that you *must* send any correspondence through your official UM student email account. For more information on setting up and using your official UM student email account contact tech support.

Diversity, Equity, and Inclusivity

Missoula College values the diversity of its students, faculty, and staff as an essential strength that contributes to our shared educational mission. Students of all backgrounds and perspectives are recognized and respected in this class. Course content and activities are intended to honor diversity of gender, sexuality, ethnicity, race, culture, religion, age, disability, socioeconomic status, and all

dimensions of diverse human experiences and their intersection. Please notify your instructor if components of this course present barriers to your inclusion. Students can also reach out to Dr. Salena Beaumont Hill in the [Office of Inclusive Excellence for Student Success](#), which provides student support for BIPOC and LGBTQ+ students and student groups. To explore making a formal report about discrimination or harassment, please visit the [Equal Opportunity / Title IX office](#). For counseling or advocacy related to discrimination, please visit [SARC](#).

Student Support Resources (including COVID-Specific Policies and Information)

Keep yourself updated and informed as policies evolve. Prepare to adapt

From the Office of the Provost: [Student Support Resources](#)