



Department of Physics and Engineering
PSC 1023 – Earth and Space Science for
Teachers 3 Units
Prerequisites: PSC1014

Spring 2023

WF: 2:45–4:00 Latter Hall (LA-1)
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Office hours: Monday, 2:45–4:00 PM Rohr Science 278 By Appointment in Zoom

PLNU Mission To Teach – To Shape – To Send

Point Loma Nazarene University exists to provide higher education in a vital Christian community where minds are engaged and challenged, character is modeled and formed, and service is an expression of faith. Being of Wesleyan heritage, we strive to be a learning community where grace is foundational, truth is pursued, and holiness is a way of life.

Department Mission

The Physics and Engineering Department at PLNU provides strong programs of study in the fields of Physics and Engineering. Our students are well prepared for graduate studies and careers in scientific and engineering fields. We emphasize a collaborative learning environment which allows students to thrive academically, build personal confidence, and develop interpersonal skills. We provide a Christian environment for students to learn values and judgment, and pursue integration of modern scientific knowledge and Christian faith.

Course Description

An introductory survey of the disciplines of geology, oceanography, meteorology, and astronomy with discussion of philosophical and societal issues. This course focuses on topics necessary for the California multiple subject teaching credential (K-8).

Required Texts and Recommended Study Resources

- ^ *Earth Science* by Tarbuck, Lutgens and Tasa, 15th edition
- ^ A scientific calculator
- ^ Computer access (canvas assignments, zoom meetings, . . .)

Course Learning Outcomes

This course builds upon the foundation of Physical Science (PSC 1014). Upon completion of this course you should be able to:

1. Explain observations of the natural world in terms of chemistry and physics,
2. Develop content expertise in the “Earth & Space Science” described in the Next Generation Science Standards, and supporting “Physical Science” content (and the content from PSC1014). Note that the focus of this course is science content and not teaching methods
3. To become familiar with the nature of scientific and analytical thinking within the framework of a liberal arts education.
4. To relate these concepts to the Christian faith.

New content includes:

- a. understand the materials and systems of Earth, including weathering, erosion, tectonic activity as well as the energy flows and matter cycles within Earth’s systems,
- b. understand plate tectonics, volcanoes, and earthquakes,
- c. understand the roles of water in and on Earth’s surface,
- d. understand the role of living things on local environments, the biosphere, and the interplay between the biosphere and Earth’s other systems,
- e. understand natural hazards,
- f. understand requirements for life,
- g. understand the history and processes of Earth,
- h. understand weather, complex interactions that determine regional weather patterns, climate, and global climate systems and processes,
- i. understand human impacts on Earth systems, including global climate change.
- j. understand the cause for Earth’s seasons and ice ages, eclipses, lunar phases,
- k. understand the patterns of celestial movements, Kepler’s laws, and Newton’s version of Kepler’s law, and conservation of energy and momentum,
- l. understand the life cycle of stars and the creation of solar systems, and light spectra,

Course Credit Hour Information:

In the interest of providing sufficient time to accomplish the stated course learning outcomes, this class meets the PLNU credit hour policy for a 3 unit class delivered over 15 weeks. It is anticipated that students will spend a minimum of 37.5 participation hours per credit hour on their coursework. For this course, students will spend an estimated 112 total hours meeting the course learning outcomes. The time estimations are provided in the Canvas modules.

Assessment And Grading

Activities/Projects: Various activities, usually completed in class. Note that these are intended to

be done in class and may not be submitted later (unless your absence is an officially excused one). They will comprise 25% of your overall grade.

Homework: Homework problems are designed to help you synthesize relevant ideas. They will lose 25% of their original value for each calendar day they are late. Exceptions will be made for officially excused absences and other special circumstances. They will comprise 20% of your overall grade.

Exams: Tests will comprise 30% of your overall grade. There will be three exams that will each be worth 10% of your overall grade.

Final exam will be given on Wednesday 3 May 1:30-4:00PM, and will comprise 25% of your overall grade.

Examinations and the Final Examination: Examinations and the Final Examination will include problems and questions over material assigned in the text, readings and handouts, as well as material presented in class. No examination shall be missed without prior consent or a well-documented emergency beyond your control. A score of zero will be assigned for an examination that is missed without prior consent or a well-documented emergency beyond your control. The final exam date and time is set by the university at the beginning of the semester and may not be changed by the instructor. This schedule can be found on the university website and in the course calendar. No requests for early examinations will be approved. Only in the case that a student is required to take three exams during the same day of finals week, is an instructor authorized to consider changing the exam date and time for that particular student.

Late work will not be accepted without prior consent or a well-documented emergency.

Grading Scale

Grades are based on the number of points accumulated throughout the course with the following exception. A student must pass at least one of the three exams or the Final Exam in order to pass the class. That is, a score of 60% must be achieved on one of the Exams, or else the final grade will be an F regardless of all other point totals. Approximate minimal percentages required to obtain a given grade are:

A B C D F

B+ 87–89 C+ 77–79 D+ 67–69 F Less than 60

A 93–100 B 83–86 C 73–76 D 63–66

A- 90–92 B- 80–82 C- 70–72 D- 60–62

Incompletes and Late Assignments

All assignments are to be submitted/turned in by the beginning of the class session when they are due — including assignments posted in Canvas. Incompletes will only be assigned in extremely unusual circumstances.

Class Enrollment

It is the student's responsibility to maintain his/her class schedule. Should the need arise to drop this course (personal emergencies, poor performance, etc.), the student has the responsibility to follow through (provided the drop date meets the stated calendar deadline established by the university), not the instructor. Simply ceasing to attend this course or failing to follow through to arrange for a change of registration (drop/add) may easily result in a grade of F on the official transcript.

PLNU Copyright Policy

Point Loma Nazarene University, as a non-profit educational institution, is entitled by law to use

materials protected by the US Copyright Act for classroom education. Any use of those materials outside the class may violate the law.

PLNU Academic Honesty Policy

Students should demonstrate academic honesty by doing original work and by giving appropriate credit to the ideas of others. Academic dishonesty is the act of presenting information, ideas, and/or concepts as one's own when in reality they are the results of another person's creativity and effort. A faculty member who believes a situation involving academic dishonesty has been detected may assign a failing grade for that assignment or examination, or, depending on the seriousness of the offense, for the course. Faculty should follow and students may appeal using the procedure in the university Catalog. See Academic PoliciesLinks to an external site. for definitions of kinds of academic dishonesty and for further policy information.

PLNU Academic Accommodations Policy

PLNU is committed to providing equal opportunity for participation in all its programs, services, and activities. Students with disabilities may request course-related accommodations by contacting the Educational Access Center (EAC), located in the Bond Academic Center (EAC@pointloma.edu or 619-849-2486). Once a student's eligibility for an accommodation has been determined, the EAC will issue an academic accommodation plan ("AP") to all faculty who teach courses in which the student is enrolled each semester. PLNU highly recommends that students speak with their professors during the first two weeks of each semester/term about the implementation of their AP in that particular course and/or if they do not wish to utilize some or all of the elements of their AP in that course. Students who need accommodations for a disability should contact the EAC as early as possible (i.e., ideally before the beginning of the semester) to assure appropriate accommodations can be provided. It is the student's responsibility to make the first contact with the EAC.

Sexual Misconduct and Discrimination:

Point Loma Nazarene University faculty are committed to helping create a safe learning environment for all students. If you (or someone you know) have experienced any form of sexual discrimination or misconduct, including sexual assault, dating or domestic violence, or stalking, know that help and support are available through the Title IX Office at <https://www.pointloma.edu/Title-IX>. Please be aware that under Title IX of the Education Amendments of 1972, it is required to disclose information about such misconduct to the Title IX Office.

If you wish to speak to a confidential employee who does not have this reporting responsibility, you can contact Counseling Services at counselingservices@pointloma.edu or find a list of campus pastors at <https://www.pointloma.edu/title-ix>.

PLNU Attendance and Participation Policy

Regular and punctual attendance at all synchronous class sessions is considered essential to optimum academic achievement. If the student is absent for more than 10 percent of class sessions (virtual or face-to-face), the faculty member will issue a written warning of de-enrollment. If the absences exceed 20 percent, the student may be de-enrolled without notice until the university drop date or, after that date, receive the appropriate grade for their work and participation. In some courses, a portion of the credit hour content will be delivered asynchronously and attendance will be determined by submitting the assignments by the posted due dates. See Academic PoliciesLinks to an external site. in the Undergraduate Academic Catalog. If absences exceed these limits but are due to university excused health issues, an exception will be granted.

Spiritual Care

Please be aware PLNU strives to be a place where you grow as whole persons. To this end, we provide resources for our students to encounter God and grow in their Christian faith. If students have questions, a desire to meet with the chaplain or have prayer requests you can contact the

Office of Spiritual Development Links to an external site.

State Authorization:

State authorization is a formal determination by a state that Point Loma Nazarene University is approved to conduct activities regulated by that state. In certain states outside California, Point Loma Nazarene University is not authorized to enroll online (distance education) students. If a student moves to another state after admission to the program and/or enrollment in an online course, continuation within the program and/or course will depend on whether Point Loma Nazarene University is authorized to offer distance education courses in that state. It is the student's responsibility to notify the institution of any change in his or her physical location. Refer to the map on State Authorization to view which states allow online (distance education) outside of California.

Course Calendar

Date	Topic	Text
January 11 January 13	Introduction Matter and Minerals	chapter 1 chapter 2
January 18 January 20	Rocks Plate Tectonics	chapter 3 chapter 4
January 25 January 27	Earthquakes	chapter 5
February 1 February 3	Igneous Activity Exam # 1	chapter 6
February 8 February 10	Mountain Building Weathering & Mass Movement	chapter 7 chapter 8.2,7-8
February 15 February 17	Running Water Glaciers	chapter 9.1-8 chapter 10.1-6
February 22 February 24	Geologic Time	chapter 11

March 1 March 3	Earth Evolution Exam # 2	skin chapter 12
March 8 March 10	Spring Break Spring Break	No class No class
March 15 March 17	Water & Oceans Atmosphere	chapters 14.1–2, 15.1–2, 5 chapter 16
March 22 March 24	Moisture	chapter 17
March 29 March 31	Wind & Pressure Storms	chapter 18 chapter 19
April 5 April 7	Climate Good Friday	chapter 20.8–10 No class
April 12 April 14	History of Astronomy	Exam # 3 chapter 21
April 19 April 21	Tides Solar System Tour	chapter 15.9 chapter 22
April 26 April 28	Light & Sun and Beyond!	chapter 23 chapter 24
May 3	Final Exam	Wednesday 1:30–4:00 p.m.