

Point Loma Nazarene University
Physics and Engineering
PSC1023 Earth and Space Science for Teachers
Number of Units 3
WF 2:45-4:00 PM Latter 2
Final Exam: Friday May 3, 1:30-4:00 PM
Spring 2024

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Office hours: By appointment

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

PSC1023 Earth and Space Science for Teachers (3)

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).

Prerequisite(s): PSC 1014

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.

New content includes:

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

REQUIRED TEXTS AND RECOMMENDED STUDY RESOURCES

Earth Science by Tarbuck, Lutgens and Tasa, 15th edition
A scientific calculator

Something to write with/on

Computer access to complete assignments in Canvas and do other activities.

NOTE: Students are responsible to have the required textbooks prior to the first day of class. Students are also encouraged to begin reading the books in preparation for the class as soon as possible.

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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 fifteen weeks. Specific details about how the class meets the credit hour requirement can be provided upon request. (Based on 37.5 hours of student engagement per credit hour.)

ASSESSMENT AND GRADING

Graded Components

- **In-Class Explorations:** Various activities completed in class and turned in on paper at the end of the class session. They may not be submitted after class unless your absence is an officially excused one. Your two lowest scores will be dropped.
- **Homework:** You may work with other people on your homework, but each individual will be responsible for writing up the entire homework assignment and turning it in. The homework is due at the start of class on the days specified.
- **Extra Credit:** Earth observations project (optional, extra-credit), this can add points up to 5% of the course 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. In that case, the make-up exam will take place at 8:30 AM on the Saturday before final exams (April 27, 2024). A score of zero will be assigned for an examination that is missed without prior consent or a well-documented emergency beyond your control.

- **Final Examination Policy.** Successful completion of this class requires taking the cumulative final examination on its scheduled day. The final examination schedule is posted on the [Class Schedules](#) site. If you find yourself scheduled for three (3) or more final examinations on the same day, you are authorized to contact each professor to arrange a different time for one of those exams. However, unless you have three (3) or more exams on the same day, no requests for alternative final examinations will be granted.
- **Late work will not be accepted** without prior consent or a well-documented emergency.
- The examination schedule is included in the daily schedule. This instructor does not intend to accept excuses such as poor communication with parents, benefactors, surf team sponsors and/or travel agents.

Grading Distribution	Percent
In Class Explorations	20
Homework	20
Exams (2 exams)	30
Final Exam	30
Earth Observation Project (Extra Credit)	
Total	100

Grading Scale

Final Grades will be based on the following table. Note that the lower portion of the range is inclusive, while the upper end of the range is exclusive. So, 87.5% is a B+ while 90.0% is an A-.

Standard Grade Scale Based on Percentages					
	A	B	C	D	F
+		87.5- 90.0	77.5-80.0	67.5-70.0	
	92.5 -100	82.5-87.5	72.5-77.5	62.5 -67.5	0-60
-	90.0-92.5	80.0-82.5	70.0-72.5	60.0-62.5	

INCOMPLETES AND LATE ASSIGNMENTS

All homework 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.

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 you have questions, a desire to meet with the chaplain or have prayer requests you can contact your professor or the [Office of Spiritual Life and Formation](#).

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.

PLNU COPYRIGHT POLICY

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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.

ARTIFICIAL INTELLIGENCE (AI) POLICY

Use of Artificial Intelligence (AI) tools (e.g, ChatGPT, iA Writer, Marmot, Botowski) in creating written work for this class is not permitted, and use of these tools will be treated as plagiarism.

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.

LANGUAGE AND BELONGING

Point Loma Nazarene University faculty are committed to helping create a safe and hospitable learning environment for all students. As Christian scholars we are keenly aware of the power of language and believe in treating others with dignity. As such, it is important that our language be equitable, inclusive, and prejudice free. Inclusive/Bias-free language is the standard outlined by all major academic style guides, including MLA, APA, and Chicago, and it is the expected norm in university-level work. Good writing and speaking do not use unsubstantiated or irrelevant generalizations about personal qualities such as age, disability, economic class, ethnicity, marital status, parentage, political or religious beliefs, race, gender, sex, or sexual orientation. Inclusive language also avoids using stereotypes or terminology that demeans persons or groups based on age, disability, class, ethnicity, gender, race, language, or national origin. Respectful use of language is particularly important when referring to those outside of the religious and lifestyle commitments of those in the PLNU community. By working toward precision and clarity of language, we mark ourselves as serious and respectful scholars, and we model the Christ-like quality of hospitality.

You may report an incident(s) using the [Bias Incident Reporting Form](#)[Links to an external site.](#).

SEXUAL MISCONDUCT AND DISCRIMINATION

In support of a safe learning environment, 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 accommodations and resources are available through the Title IX Office at pointloma.edu/Title-IX. Please be aware that under Title IX of the Education Amendments of 1972, faculty and staff are 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 pointloma.edu/title-ix.

PLNU ATTENDANCE AND PARTICIPATION POLICY

Regular and punctual attendance at all class sessions is considered essential to optimum academic achievement. If the student is absent for more than 10 percent of class sessions, 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. See [Academic Policies](#) in the Undergraduate Academic Catalog. If absences exceed these limits but are due to university excused health issues, an exception will be granted.

Use of Technology

You will need to have a computer in order to access Canvas and carry out other required tasks. Problems with technology do not relieve you of the responsibility of participating, turning in your assignments, or completing your class work.

Please don't use your laptops during class, unless we are doing a task that explicitly requires them. You may use tablets to take notes or follow along with the slides, but not laptop computers.

Course Summary:

Date	Details	Due
Wed Jan 10, 2024	Assignment Activity: Topic Survey	due by 4pm
Wed Jan 17, 2024	Assignment Minerals and Atoms	due by 4pm
Fri Jan 19, 2024	Assignment Activity: Earthquake Damage	due by 4pm
	Assignment Activity: Rock Cycle	due by 4pm
Wed Jan 24, 2024	Assignment Activity: Play with (igneous) rocks	due by 4pm

Date	Details	Due
Fri Jan 26, 2024	Assignment Homework: Plate tectonics	due by 2:45pm
	Assignment Activity: Stream Feature Worksheet	due by 4pm
	Assignment Homework: Overview, Minerals and Rocks	due by 11:59pm
Fri Feb 2, 2024	Assignment Activity: Living Machine	due by 4pm
	Assignment Activity: Plate Features	due by 4pm
Wed Feb 7, 2024	Assignment Homework : Weathering, erosion and streams	due by 2:45pm
Fri Feb 9, 2024	Assignment Activity: Geology Hazards	due by 4pm
Wed Feb 14, 2024	Assignment Earthquakes and Igneous Activity	due by 11:59pm
Fri Feb 16, 2024	Assignment Homework: Mountains and Erosion	due by 2:45pm
Wed Feb 21, 2024	Assignment Activity: Decay Simulation	due by 4pm
	Assignment Activity: Plate tectonics map	due by 4pm
	Assignment Activity: Things in Order	due by 4pm
	Assignment Your Favorite Rocks (Extra Credit)	due by 11:59pm
Fri Feb 23, 2024	Assignment Exam #1	due by 2:45pm
	Assignment Homework : Geology Exam Review	due by 2:45pm

Date	Details	Due
	Assignment Homework: Geological Time	due by 2:45pm
	Assignment Homework : News #1 (geology)	due by 11:59pm
	Assignment Pictures of Landforms (Extra Credit)	due by 11:59pm
Wed Mar 13, 2024	Assignment Homework: Ocean Review	due by 2:45pm
Fri Mar 15, 2024	Assignment Activity: Weather Songs	due by 4pm
Wed Mar 27, 2024	Assignment Activity: Controls of Climate	due by 4pm
Wed Apr 3, 2024	Assignment Homework: Weather	due by 2:45pm
	Assignment Activity: Temperature Trends	due by 4pm
Fri Apr 5, 2024	Assignment Exam #2	due by 2:45pm
	Assignment Pictures of Weather (Extra Credit)	due by 11:59pm
Wed Apr 17, 2024	Assignment Activity: Astronomy Names of Note	due by 4pm
Fri Apr 19, 2024	Assignment Activity: Just a Cog?	due by 4pm
Fri Apr 26, 2024	Assignment Homework: Newspaper #2 (weather/stars)	due by 2:45pm
	Assignment Earth Media (Extra Credit)	due by 11:59pm
Wed May 1, 2024	Assignment Homework: Astronomy	due by 2:45pm

Date	Details	Due
Fri May 3, 2024	Assignment Final Exam (1:30-4:00 PM)	due by 1:30pm

Date	Topic	Book Section	Homework Dates
January 10	Syllabus/Introduction	1:1-4	
January 12	Matter/Minerals	2:1-5	
January 17	Rocks	3:1-4	
January 19			
January 24	Weathering/Mass Movement	8:1-2,7	Homework 1 due
January 26	Running Water	9:1-8	
January 31	Earthquakes	5:1-7	
February 2	Plate Tectonics	4:1-10	
February 7			
February 9	Volcanoes	6:1-12	Homework 2 due
February 14	Mountains	7:1-7	
February 16	Geologic Time	11:1-7	
February 21			
February 23	Exam #1		Homework 3 due
February 28	Oceans	13:1-2, 14:1-2, 15:1-2, 4 16:1-8	
March 1	Atmosphere		
March 6	Spring Break		
March 8	Spring Break		
March 13	Moisture	17:1-9	
March 15			
March 20	Pressure & Wind	18:1-8	Homework 4 due
March 22	Storms	19:1-6	
March 27	Climate	20:1,8-10, skim 10:1-6	
March 29	Good Friday		
April 3			
April 5	Exam #2		Homework 5 due
April 10	Origins of Astronomy	21:1-6	
April 12	Tides	15:9	
April 17	Solar System	22:1-5	
April 19	Light & Sun	23:1-6	
April 24	Stars & Galaxies	24:1-5	
April 26			Homework 6 due
May 3	Final Exam		