PSC 1023 – Earth & Space Science for Teachers 3 Units Spring 2020

PLNU Mission Statement
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.

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Office Hours: M and W 8:00AM-9:30AM, 10:45AM-2:00PM, T and Th 12:00PM-12:30PM,or by appointment. NOTE if you really need to see me, I will also be around Th (time TBD) and on M from about 9:45:00AM to 10:45AM but this is also during Chapel time – so you'll have to make up Chapel one evening.

Regular meeting times: January 14, 2020 – May 1, 2020 (NOTE: T Jan 14 is a M schedule)
Lecture: T Th 9:30 PM – 10:45 AM (LBRT 202)
Final Exam: Tuesday, May 5 at 10:30 AM – 1:00 PM

Textbook: Physical Science by Bill Tillery, 12th edition

A scientific calculator (not a phone app) is also needed for the course. It doesn't need to be fancy. For example a TI-30XIIS is good and only runs about $15.

Course Description: (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

PLNU provides a foundational course of study in the liberal arts informed by the life, death, and resurrection of Jesus Christ. In keeping with the Wesleyan tradition, the curriculum equips students with a broad range of knowledge and skills within and across disciplines to enrich major study, lifelong learning, and vocational service as Christ-like participants in the world's diverse societies and cultures.

Student Learning Outcomes: In each section there are a number of smaller learning outcomes, which fit into broader course outcomes. Upon completion of this course you should be able to:

1. explain observations of the natural world in terms of chemistry and physics,
2. translate the description of problems into the equations required to solve them using relevant physical principles,
3. find solutions to problems once appropriate equations or techniques are identified,
4. create and interpret graphical representations of quantities,
5. recognize appropriate teaching techniques to convey scientific ideas and practices,
6. develop content expertise in the "Earth & Space Science" described in the Next Generation Science Standards, and supporting "Physcial Science" content (and the content from PSC1014). 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, elcipses, 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 environmemtns, the biosphere, and the inerplay 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.

Preclass Assignments: Reading and pre-class questions are due by 11:59 PM the night before class, unless otherwise noted. The pre-class questions are on Canvas. These usually consist of questions and simple problems related to each section of the reading assignment. Preclass assignments are 5% of the overall grade. Late submissions will not be accepted. These submissions will be graded on the following scale: 2 = demonstrates reading, 1 = room for improvement, 0 = unsatisfactory.

Homework: Homework assignments, besides the readings and preclass questions, can be found on Canvas. Homework usually consists of a set of problems related to chapter material. These chapter problem sets are worth 12% of your overall grade and are due at the start of class on the date noted in the syllabus and Canvas. Practicing solving problems is critical to success in this course. Homework will not be accepted late except for acceptable documented emergencies provided.

Late Work: Late work will not be accepted unless there is a documented emergency. Assignments are due as noted on the syllabus and Canvas. Incompletes are only assigned in extremely unusual circumstances.

Activities/Projects: Several activities and projects will be carried out through the semester including both hands-on applications as well as the opportunity to practice aspects of teaching. Activities often take place during the class meeting and cannot be made up, unless arrangements were made ahead of time. Activities and Projects will make up 12% of your grade.

Teaching Lesson: There will be assignments involving writing lesson plans and teaching material with an elementary school audience in mind. These assignments will make up 10% of your grade.

Exams: There will be three in class exams during the semester comprising 36% of your grade. There is also a final exam (worth 25% of your overall grade) on **DATE**. Partial credit for non-multiple choice problems will be given for correct reasoning at any step of a problem, but only if it is communicated clearly enough for me to understand. For problems that call for providing your work or explanation, no credit will be given for an answer alone; the method or reasoning must also be shown.

You must take ALL the exams and the final in order to pass the class.

Missed Exam Policy: No make-up exams are allowed except for warranted circumstances. Arrangements must be made with me as soon as possible.

Final Exam: Tuesday, May 5 at 10:30 AM – 1:00 PM. 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. Successful completion of this class requires taking the final examination on its scheduled day, **FINAL EXAM: Tuesday, May 5 at 10:30 AM – 1:00 PM**. The final examination schedule is posted on the Class Schedules site. No requests for early examinations or alternative days will be approved. The final exam is worth 25% of your grade.

Final Course Grade: The points you receive during the course are weighted accordingly:

Component	Weight
Pre-Class	5%
Homework	12%
Activities/Projects	12%
Teaching Lessons	10%
Exams (3)	36% (equally weighted)
Final Exam	25%

The grade you earn in this course is based on the following scale:

A	A-	B+	B	B-	C+	C	C-	D+	D	D-
S≥ 91.5	91.5 >S≥ 89.5	89.5 >S≥ 86.5	86.5 >S≥ 82.5	82.5 >S≥ 79.5	79.5 >S≥ 76.5	76.5 >S≥ 72.5	72.5 >S≥ 69.5	69.5 >S≥ 66.5	66.5 >S≥ 62.5	62.5 >S≥ 59.5

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.

PLNU Attendance and Participation Policy:
Attendance is expected at each class session. In the event of an absence you are responsible for the material covered in class and the assignments given that day.

Regular and punctual attendance at all classes is considered essential to optimum academic achievement. If the student is absent from more than 10 percent of class meetings, the faculty member can file a written report, which may result in 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 http://catalog.pointloma.edu/content.php?catoid=24&navoid=1581#Class_Attendance in the Undergraduate Academic Catalog.

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.

Academic Accommodations:
While all students are expected to meet the minimum standards for completion of this course as established by the instructor, students with disabilities may require academic adjustments, modifications or auxiliary aids/services. At Point Loma Nazarene University (PLNU), these students are requested to register with the Disability Resource Center (DRC), located in the Bond Academic Center. (DRC@pointloma.edu or 619-849-2486). The DRC's policies and procedures for assisting such students in the development of an appropriate academic adjustment plan (AP) allows PLNU to comply with Section 504 of the Rehabilitation Act and the Americans with Disabilities Act. Section 504 (a) prohibits discrimination against students with special needs and guarantees all qualified students equal access to and benefits of PLNU programs and activities. After the student files the required documentation, the DRC, in conjunction with the student, will develop an AP to meet that student's specific learning needs. The DRC will thereafter email the student's AP to all faculty who teach courses in which the student is enrolled each semester. The AP must be implemented in all such courses.

If students do not wish to avail themselves of some or all of the elements of their AP in a particular course, it is the responsibility of those students to notify their professor in that course. PLNU highly recommends that DRC students speak with their professors during the first two weeks of each semester about the applicability of their AP in that particular course and/or if they do not desire to take advantage of some or all of the elements of their AP in that course.

Credit Hour:
In the interest of providing sufficient time to accomplish the stated course learning outcomes, this class meets the PLNU credit hour policy for any 4 unit class delivered over 15 weeks. Specific details about how the class meets the credit hour requirements can be provided upon request.

Copyright Protected Materials:
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 http://catalog.pointloma.edu/content.php?catoid=24&navoid=1581#Academic_Honesty for definitions of kinds of academic dishonesty and for further policy information.

FERPA Policy: In compliance with federal law, neither PLNU student ID nor social security number should be used in publicly posted grades or returned sets of assignments without student written permission. This class will meet the federal requirements by distributing grades and papers individually. Also, in compliance with FERPA, you will be the only person given information about your progress in this class unless you have designated others to receive it in the "Information Release" section of the student portal. See Policy Statements in the undergrad academic catalog.

Tentative Course Schedule – subject to updates. Unless otherwise noted: Preclass assignments are due by 11:59 PM the night before class, HWs are due at the start of class on the day listed.
Additional due dates for materials related to the activities/projects and teaching lessons will be provided in class and on canvas

Date	Topics	Assignments due
1/16 Th	Intro Ch 13.1-2 Nuclear Radioactivity, Measurement of Radiation	PC1
1/21 T	Ch 13.2-4 Measurmeent of Radiation Nuclear energy, Nuclear Power Plants	PC2 Dweck Assignment due
1/23 Th	Ch 14.1-2 Night Sky, Stars	PC3 HW13
1/28 T	Ch 14.3-4 Galaxies, Universe	PC4
1/30 Th	Ch 15.1-3 Terrestrial, Jovian Planets, Asteroids, Comets	PC 5 HW14
2/4 T	Ch 15.4-5 Solar System (origin and models) Ch 16.1-2 Shape and Size of Earth, Motions of Earth	PC6 HW15
2/6 Th	Ch 16.3-5 Place and Time, The Moon, The Earth-Moon System	PC7
2/11 T	Catch Up/Review/Presentations	PC8 HW16, Project 1 due
2/13 Th	Presentations **Exam 1**	PC9
2/18 T	Ch 17.1-3 Solid Earth Materials, Minderals, Mineral Forming Processes	PC10
2/20 Th	Ch 17.4-5 Rocks, The Rock Cycle	PC11
2/25 T	Ch 18.1-3 Plate Tectonics	PC12 HW 17
2/27 Th	Ch 18.3 Tectonics Ch 19.1—3 Earth's Surface, Changing Features, Earthquakes	PC13
3/3 T	Ch 19.3-4 Earthquakes, Mountains, Review/Catch up Online-line Class and online review session	PC14 HW18, turn into mailbox by 10 AM, RS 2nd floor
3/5 Th	Short Review **Exam 2**	PC15 HW 19, Project 2 due
3/9 to 3/13	Spring Break	
3/17 T	Ch 20.1-4 Weathering, Erosion, and Transportation, Weathering, Soils, Erosion	PC16
3/19 Th	Ch 20.2-4 Weathering, Soils, Erosion Ch 21.1-2 Fossils, Reading Rocks	PC17
3/24 T	Ch 21.2-3 Reading Rocks, Geologic Time	PC18 HW20
3/26 Th	Ch 22.1-2 Atmosphere, Winds	PC19 HW 21

3/31 T	Ch 22.2-3 Winds, Water & Condensation	PC20
4/2 Th	Presentations	PC21 HW22
4/7 T	Presentations **Exam 3**	PC22 Project 3 due
4/9 to 4/13	Easter Recess – No Classes	
4/14 T	Ch 23.1-2 Clouds & Precipitation, Weather Producers	PC23
4/16 Th	Ch 23.3-4 Weather Forcasting, Climate Change	PC24
4/21 T	Ch 24.1-3 Water on Earth Freshwater, Seawater, Ocean Floor	PC25 HW23
4/23 Th	Ch 24.1-3 Water on Earth Freshwater, Seawater, Ocaean Floor	PC26
4/28 T	Review/Catch Up, Learning Stations/Presentations	PC27 HW24
4/30 Th	Rewview/Catch Up, Learning Stations/Presentations	PC28 Project 4 due
	FINAL EXAM **Tuesday, May 5 at 10:30 AM – 1:00 PM**	
	Grades turned in by May 17	