Point Loma Nazarene University

PSC 105-01: The Cosmos 4 Credits Course Syllabus, Summer 2017

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Class Meeting Time and Place: Latter 1: 10:00-12:30 MTWR

PLNU *forward*

PLNU Mission

To Teach ~ To Shape ~ To Send 

University Mission:
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 becomes an expression of faith. Being of Wesleyan heritage, we aspire 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.

Materials - The Cosmic Perspective Fundamentals, 2e. Bennett, Donahue, Schneider, Voit (2015) San Francisco: Pearson & Co. The text book is aimed to help you prepare for the class and answer reading questions posted on Canvas every week.

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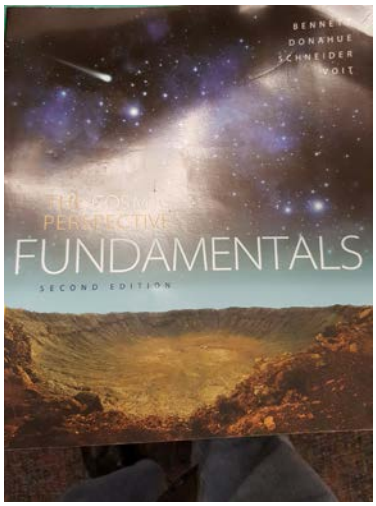
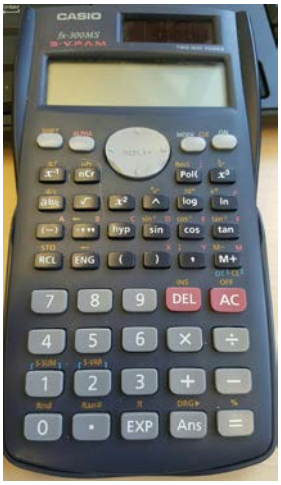


Professor's note:

1) For a physical science class like astronomy, you will need a "Scientific Calculator" that allows you to use powers of ten to represent numbers in scientific notation, (e.g. $\boldsymbol{6.02 \times 10^{23}}$), with an "EXP" or "EE" function button. These calculators can be any brand, like Casio. Most of them you can get for $6 - $7 apiece.
2) Do **not** get a business calculator, because those calculators do not feature scientific notation, and they cannot store extremely large or extremely small numbers that you can with a scientific calculator. They will not help you in astronomy.
3) The app that some people use on a smart phone is ***not*** a substitute for a scientific calculator. Please make a note of this.



Casio Scientific Calculator

CANVAS and COURSEWORK:

The online resource Canvas is integral for this course, and you are expected to login regularly. You need a reliable internet connection to be able to use this resource.

Online resources:

If you textbook is late use http: //www.astronomynotes.com/ to get ready for the class. Chapter 1 (Astronomy as a Science and a Sense of Scale) and Chapter 3 (Astronomy without a Telescope) will be covered in the first two weeks of class.

University of Nebraska-Lincoln also has free astronomy resources.
ClassAction, NAAP Labs, Interactives and Videos
http://www.astro.unl.edu/classaction/
Astronomy Picture of the Day: This online reference is worth looking at regularly.
http://www.apod.nasa.gov

COURSE DESCRIPTION

An introduction to our place in the universe emphasizing religious, cultural and historic perspectives including modern developments in physics and astronomy. (Meets a general education requirement; does not count toward any Chemistry or Physics majors.)
Prerequisite(s): MTH 099 or equivalent.
This course is one of the components of the General Education Program at Point Loma Nazarene University, in support of the general education learning outcome: *Quantitative Reasoning: Students will be able to solve problems that are quantitative in nature*. The purpose of general education is to provide a common educational experience, to develop essential skills, and to provide a broad cultural background for personal and professional growth. PSC 105 – The Cosmos is an introductory course appropriate for students with an adequate background in high school mathematics.

COURSE LEARNING OUTCOMES

– An emphasis is placed on both conceptual understanding and the ability to solve problems dealing with the concepts studied. As part of the General Education at Point Loma this particular course places a particular emphasis on quantitative reasoning, particularly through the lens of the physical sciences.
The main objective of this course is to fulfill the physical science requirement of a general college education while using the discipline of astronomy as a tool. That is, this course aims to teach you how to think critically and scientifically, and to give you a cosmic perspective of our universe.

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COURSE LEARNING OUTCOMES

Specifically you be able to:

1. Developing basic scientific literacy and insight into the integrated scientific description of our whole cosmos.

2. Understanding how modern science relates to human culture and the origins of modern cosmology.

3. Observe the science of the physical universe as a dynamic changing system, and which of these processes are evolutionary processes.

4. The integration of modern science and personal faith.

General Education Learning Outcomes: GELO 1e will be assessed directly using problems on the final exam that are quantitative in nature.

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.

Class Meetings – Learning astronomy requires active learning and participation during class. In preparation for each class meeting there is a reading assignment. To maximize your learning and participation during our meetings it is very important that you have read this material before class.

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 a 4 unit class delivered over 5 weeks.

Technology, devices and classroom participation policy: For my lecture classes, use of computers such as notebooks, iPad and similar devices shall be used just for class activities, PowerPoint, etc. Use of extra-curricular apps such as texting and social media needs to be controlled or closed such that it does not disrupt or distract the classroom environment, classmates or the instructor. Please be professional and courteous in this area of your use of technology in the classroom.

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Attendance 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.

ASSESSMENT AND GRADING

Homework/In Class problems – Homework is worth 20% of your final grade.

Submission: Written homework solutions should be worked neatly in clear logical steps. (Solutions and explanations should be clear enough that one of your peers could easily follow what you did if they had not worked the problem before.)

Collaboration: We expect and encourage collaboration between you and your peers while working on your homework, but your work should be your own original solutions. Allow adequate time to work and think about problems by yourself first before you work together with your peers or ask questions of me. When you sit down to write up a problem, you should not use notes copied from someone else. The guideline is that you should have no trouble explaining or repeating work that you turn in.

Late Work: I generally do not accept late work unless there is a documented emergency. If late work is submitted, the following applies:

Late Submission: Up to one late assignment per quad will be accepted late with a 10% reduction in grade for every day it is late. This begins with a 10% reduction for an assignment turned in later in the day after this homework has been collected at the beginning of class.

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Exams – Examinations will be given in class, which count toward 40% of your final grade, consisting of three midterms. The final exam is comprehensive and counts for 25% of your grade. Exams will be closed book. Partial credit will be given for correct reasoning at any step of the problem, but only if it is communicated clearly enough for me to understand. For problems that call for a solution or explanation, no credit will be given for an answer alone; the method or reasoning must also be shown.

Policy for missed exams: Unless you have express written permission from me long before the date of the exam to take the exam on another day, there will be no makeup exams for this course.

Final Grades – The grade you earn in this course is roughly based on the following scale: 100%-90% A, 90%-88.0% A-, 88%-85% B+, 85%-81% B, 81%-78% B-, 78%-75% C+, 75%-70% C, 70%-68% C-, 68%-65% D+, 65%-61% D, 61%-57% D-. The points you receive during the course are weighted accordingly: in-class quizzes and homework: 35%, exams (4): 40%, final exam: 25%.

The Final Exam will be on the Last Day of Class: June 8, 2016, Thursday, 10:00 a.m.

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 Policies for definitions of kinds of academic dishonesty and for further policy information.

PLNU ACADEMIC ACCOMMODATIONS POLICY

If you have a diagnosed disability, please contact PLNU's Disability Resource Center (DRC) within the first two weeks of class to demonstrate need and to register for accommodation by phone at 619-849-2486 or by e-mail at DRC@pointloma.edu. See Disability Resource Center for additional information.

Students with learning disabilities who may need accommodations should discuss options with the instructor during the first two weeks of class.

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PLNU ATTENDANCE AND PARTICIPATION POLICY

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 Academic Policies in the Undergraduate Academic Catalog.

FINAL EXAMINATION POLICY

Successful completion of this class requires taking the final examination **on its scheduled day**. 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 date and time ix 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 examinations in the same day of finals week, is an instructor authorized to consider changing the exam date and time for that particular student.

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.

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 (Note: each faculty member should choose one strategy to use: distributing all grades and papers individually; requesting and filing written student permission; or assigning each student a unique class ID number not identifiable on the alphabetic roster.). 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/ graduate as appropriate) academic catalog.

Questions are always welcome and encouraged. The best way to learn is to ask questions and challenge what you are being taught. Feel free to talk to me after class or via email if you have any questions. I hope you enjoy my course!

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PSC 105 Class Schedule (Tentative Summer Schedule, Under Construction) 

Week	Date	Topics covered	Chapters, pages
Week 1	05/08	Introduction: Why Cosmos	Introductions
		Chapter 1: Modern View of the Universe	Intro. Of Text
	05/09	Local Neighborhood, Scale for the Universe, History	**Ch1** 1-9 10-17
	05/09	Chapter 2: Discovering the Universe	**Ch 2** 19-26
	05/10	Constellations, Motions in the Sky Seasons	28-29
	05/10	Chapter 2: Moon phases Eclipses,	**Ch 2** 26-28
	05/11	Chapter 2: Planetary Motion	31-32
	05/11	Chapter 3 Science and History Theory of Gravity, Newton	**Ch 3** 37-41 41-47
Week 2	05/15	Origin of the Solar System	**Ch 4** 55-62
	05/15	Solar System Theory Nebular collapse, stratification	62-71
	05/16	Temperature, composition Timeline and ages	71-73
	05/16	**Exam Review**	**Ch 1 – Ch 3, some 4**
	05/17	EXAM #1	
	05/17	Earth, Moon and the Terrestrial Planets	**Ch 5** 76-82
	05/18	Histories of the terrestrial planets	82-88
	05/18	Greenhouse effect,	88-91
	05/18	Global warming	
Week 3	05/22	Outer Solar System Jovian planets, moons Rings, and atmospheres	**Ch 6** 95-106 95-106
	05/22	Asteroids, comets and impacts	106-109
	05/22	Extinction of Earth's dinosaurs Planets about other Stars Extra Solar planet, habitable zones	**Ch 7** 113-120
	05/23	Properties of the Sun other stars, Sun's evolution, Classifying the stars High mass stars	**Ch 8** 128-135 135-142

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	05/23	Stellar Lives, equilibrium	**Ch 9** 146-155
	05/24	Stellar Death, White dwarfs	152-162
		Planetary Nebula	
	05/24	Neutron Stars	**Ch 10** 166-171
	05/24	Black holes	169-175
	05/25	and Supernovae	
		EXAM Review	**Ch 4-6, 8-10**
	05/25	EXAM #2	
Week			
	05/29	Holiday – Memorial Day 	
		No Class	
4			
	05/30	Black Holes, Supernova and GRBs	175-176
		Our Galaxy, The Milky Way	**Ch 11** 183-189
		Other Galaxies	189-193
	05/30	Types of Galaxies	
	05/31	How do galaxies differ?	193-194
		Super massive black holes	
	05/31	Galactic distances	**Ch 12** 198 - 202
	05/31	Exam Review	
	06/01	EXAM #3	
	06/01	Hubble's Law	**Ch 12** 202-206
Week			
5	06/05	Super clusters Galaxy evolution	206-208
		Earlier universes	
	06/05	Birth of the Universe, Big Bang	**Ch 13** 213-218
	06/06	Cosmology, CMB evidence	219-223
	06/06	Very Early universe, inflation	224-225
	06/07	Dark Matter	**Ch 14** 230-237
	06/07	Gravity, Dark Energy	242-246
		(Time permitting)	
		Life in the Universe	**Ch 15** 250-253
		Search for life	254-261
`		Final Exam Review	
	06/08	**FINAL EXAM – 10:00 – 12:30** 	

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