Point Loma Nazarene University

PSC 105-01: The Cosmos 4.0 units **Course Syllabus, Fall 2016**

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Class Meeting Time and Place: (SB 100) 10:55-12:05 MWF

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 – Discovering the Universe, 10th edition. Comins, Kaufmann, (2014) W. H. Freeman and Co., New York. 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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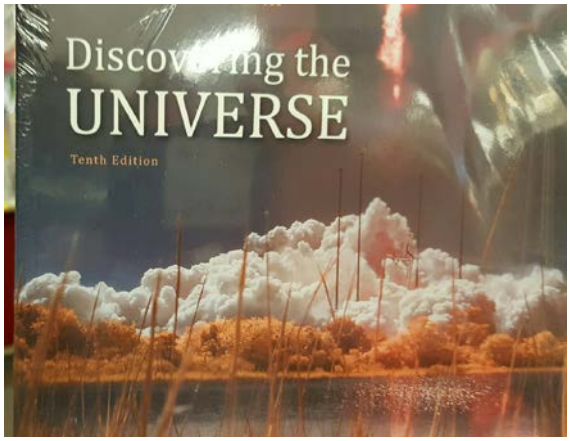
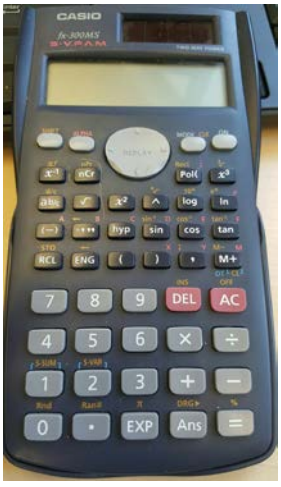
Text



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.

Course Learning Outcomes: (continued)

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.

Attendance: 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.

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ASSESSMENT AND GRADING

Homework/Assigned reading quizzes – Homework is worth 20% of your final grade. Reading assignments will be given to the class to read portions of the material ahead of time before the class lecture. Short quizzes will be given at the start of class based on the reading assignment.

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 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.

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.

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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%.

Final Exam: Date and Time: 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. The **Final Exam** date for this class is **Wednesday, December 14, 2016 – 10:30-1:00 p.m.**

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 15 weeks.

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.

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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 Fall Schedule)

Week	08/30	Introduction: Discovering The Night Sky	Ch 1, Pages 1-14
1	08/31	History of the Universe, Modern View, Constellations Defining Planets	sections 1.1 – 1.3
	09/02	Understanding the Sky Understanding the Seasons	Ch 1, Pages 15-32 sections 1.4 – 1.9
Week	09/05	**Labor Day Holiday: No Class**	
2	09/07	The Earth and Moon	Ch 1, 1.12 -1.15
	09/09	Moon Phases, Eclipses	
Week	09/12	Planetary Motion	Ch 2, section 2.1
		Chapter 2: Changes in our Perspective, Emerging astronomers	Ch 2, 2.2
3	09/14	Scientific Theory, and pseudoscience Theory and Fact of Gravity Gravity and motion Energy and Conservation	Ch 2, 2.6 – 2.9
	09/16	Chapter 5: Origin of the Solar System, Formation theory Age of Formation, Exoplanets and Detection Earth-like planets, the habitable zone	Ch 5, 5.1 – 5.14
Week	09/19	Chapter 6: Terrestrial Worlds The Terrestrial planet Earth and The Moon, Earth tides	Ch 6, sections 6.1-6.9
4	09/21	Chapter 7: Other Terrestrial Planets, Surface changes of planets Temperature composition	Ch 7 7.1 ,7.2 – 7.5 sections 7.8-7.16
	09/23	Atmospheres, Global warming	Sections 7.6, 7.7

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Week	09/26	**EXAM #1**	Chapters 1-6
5	09/28	Chapter 6: The Outer Planets Jupiter and Moons	Ch 8, sections 8.1-8.8
	09/30	Saturn, Rings and Moons Jovian Planet compared to Terrestrial Jovian Moons, Triton, Enceladus Uranus & Neptune	Ch 8, sect. 8.9-8.14 8.14-8.18
Week	10/03	Vagabonds of Solar System Dwarf planets, Pluto, Ceres	Ch 9, sections 9.1-9.5
6	10/05	Asteroids, Comets Large Impacts and Dinosaurs	Ch 9, sections 9.3-9.9
	10/07	Meteoroids	Ch 9, sect. 9.10-9.14
Week	10/10	Chapter 10: The Sun Exterior, atmospheres	Ch 10, 10.1-10.6
7	10/12	Interior of the Sun Stellar Properties, measurements	Ch 10, 10.6-10.11
	10/14	Chapter 11: Classifications of Stars, Temperatures Luminosity, HR Diagram	Ch 11, 11.1-11.6 Ch 11.7- 11.13
Week 8	10/17	Chapter 12: Stellar Lives Main sequence	Ch 12, 12.1-12.7
	10/19	**EXAM #2**	Chapters 7-11
	10/21	**Fall Break Day: No Class**	

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Week 9	10/24	Stellar evolution with low mass Variable Stars High mass stars and processes Supernovae Stellar populations	Ch 12.7 - 12.15
	10/26	Chapter 13: Stellar Remnants Graveyard Stellar Mass and end result White Dwarf, Neutron Stars GRBs	Ch 13, 10.1 – 10.2
	10/28	Chapter 14: Black Holes, ultimate Stellar corpse Gravity and Space-time Contiuum Search for Black holes, XRBs	Ch 14, 14.12
Week 10	10/31	Chapter 15: Galaxies Our Galaxy, the Milky Way Galactic Center, Galactic Structure	Ch 15, 15.1-15.5
	11/02	Dark Matter Galaxy Formation	Ch 15, 15.6-15.8
	11/04	Chapter 16: Galaxy morphology	Ch 16, 16.1-16.7
Week	11/07	Galaxy distances Cosmic scale and distance Galactic Superclusters	Ch 16, 16.8-16.12
11	11/09	Chapter 17: Quasars Galaxies with active nuclei SMBH Engines	Ch 17, 17.1-17.6
	11/11	Chapter 18: Birth of the Universe Hubble's Law, Cosmology The Big Bang Theory Evidence: CMB, Inflation	Ch 18, 18.1-18.5
Week 12	11/14	Origin of Forces, Dark Matter, Dark Energy	Ch 18, 18.6-18.12
	11/16	Review	
	11/18	**EXAM #3**	Chapters 12-17

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Week	11/21	Gravity vs Expansion	Ch 18, 18.13-18.15
13	11/23	**No Class**: **Thanksgiving Holiday** (11/23-25)	
	11/25	**No Class: Thanksgiving Holiday** (11/25-25)	
Week	11/28	Chapter 19: Astrobiology. Life in the Universe	Ch 19, 19.1-19.3
14	11/30	Origins of Life Conditions for Life	Ch 19, 19.4-19.7
	12/02	Search for E.T. among the stars	
Week	12/05	Exoplanets revisited Kepler mission	Ch 5, all sections
15	12/07	Implications for life on other worlds	
	12/09	Review	
Week 16	12/14	**Wednesday - FINAL EXAM Cumulative Test (Mandatory)** **FINAL EXAM** 10:30 – 1:00 p.m.	

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