Point Loma Nazarene University
PSC105: The Cosmos (4 hr) Spring 2019

Department of Physics and Engineering

Instructor: Dr. Paul D. Schmelzenbach	Meeting: 8:25 -9:40 MW; -9:25 F (LBRT 203)
e-mail: PaulSchmelzenbach@pointloma.edu	Office Phone: 849-2933
Office Hours: 10:30-11:45 MWF, by appt.	Office Location: Temp Trailer 2; RS 258

Materials – *The Cosmic Perspective: Fundamentals* by Bennett, Donahue, Schneider, and Voit, 2nd Edition. Basic scientific calculator.

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.)

Learning Outcomes – 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.

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. Within these broader outcomes, in this course you will

1. apply basic scientific principles to address topics in cosmology and astronomy
2. explain observations of the cosmos in terms of scientific processes
3. apply a scientific approach to ask and address questions about our planet, galaxy, and universe
4. solve qualitative and quantitative problems relevant to introductory astronomy
5. discuss how modern science relates to human culture and the origins of cosmology

Homework Through the semester, to improve your understanding to topics you will be completing various homework assignments. On homework sets collaboration between you and your peers is fine, but your work needs to be your own. Late homework will not be accepted unless their is a documented emergency. The lowest homework score will be dropped.

Activities During the semester there will be a number of short activities which will be completed in class. I will collect many (but not all) of these in-class activities. Activities cannot be made-up or submitted late, but the lowest activity score will be dropped.

Preclass questions Each class day there will be three preclass questions to answer electronically. These will be due the evening before class. Your responses to Preclass questions are graded on the following scale: 2=demonstrates reading/thinking; 1=room for improvement or late but before class, 0=unsatisfactory or submitted after class. For credit preclass questions must be submitted prior to class.

Exams – Four examinations will be given during the semester on January 28, February 18, March 18, and April 8. The final examination is May 3 at 7:30 am. Exams cannot be made up, unless under extreme circumstances and arrangements made with the professor before the exam.

Final Grades – The grade you earn in this course is based on the scale shown to the right. The points you receive during the course are weighted accordingly:

- Homework: 25%
- Activities: 15%
- Preclass: 5%
- Tests (4): 35%
- Final Exam: 20%

A	100 - 91.0
A-	91.0 - 89.5
B+	89.5 - 87.5
B	87.5 - 81.0
B-	81.0 - 79.5
C+	79.5 - 77.5
C	77.5 - 71.0
C-	71.0 - 69.5
D+	69.5 - 67.5
D	67.0 - 61.0
D-	61.0 - 57.0

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 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.

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.

Academic Honesty – 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.

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 DRCs 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.

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.

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 16 weeks. Specific details about how the class meets the credit hour requirements can be provided upon request.

Final Exam – 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 th 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.

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Course Calendar			
	Topics	Reading	Hmk Due
1/8	Introductions		
1/9	The Scale of the Universe	1.1	
1/11	The History of Universe & Planets	1.2-1.3	Hmk 1
1/14	Understanding Seasons	2.1	
1/16	Understanding the Moon	2.2	
1/18	The Puzzle of Planetary Motion	2.3	Hmk 2
1/23	Earth-Centered to Sun Centered	3.1	
1/25	Science, Telescopes & Gravity	3.2-3.3	
1/28	Exam 1: Chapters 1-3		
1/30	Characteristics of the Solar System	4.1	
2/1	Birth and Age of the Solar System	4.2-4.3	Hmk 4
2/4	Terrestrial Planets I	5.1	
2/6	Terrestrial Planets II	5.2-5.3	
2/8	Jovian Planets, Rings and Moons	6.1	Hmk 5
2/11	Asteroids, Comets, and Impact Theory	6.2-6.3	
2/13	Planets around other Stars	7.1	
2/15	Characteristics of Extrasolar Planets	7.2-7.3	Hmk 6
2/18	Exam 2: Chapter 4-7		
2/20	Properties of the Sun	8.1	
2/22	Properties of Other Stars	8.2	Hmk 7
2/25	Patterns among the Stars	8.3	
2/27	Stellar Lives	9.1	
3/1	Star Death, and Testing Stellar Models	9.2-9.3	Hmk 8
3/11	White Dwarfs and Neutron Stars	10.1	
3/13	Black Holes	10.2	
3/15	Black Holes II	10.3	Hmk 9
3/18	Exam 3: Chapter 8-10		
3/20	Our Galaxy: The Milky Way	11.1	
3/22	Other Galaxies	11.2-11.3	Hmk 10
3/25	Cosmic Distances	12.1	
3/27	Hubble's Law	12.2	Hmk 11
3/29	Galaxy Evolution	12.3	
4/1	The Big Bang Theory	13.1	
4/3	Evidence for the Big Bang	13.2	
4/5	Inflation	13.3	Hmk 12
4/8	Exam 4: Chapter 11-13		
4/10	Dark Matter	14.1	
4/12	Gravity versus Expansion	14.2	
4/15	Dark Energy	14.3	Hmk 13
4/17	Search for Life in the Solar System	15.1	
4/24	Search for Life among the the Stars	15.2	
4/26	Wrap up	15.3	Hmk 14
5/3	Final Exam Friday at 7:30 am		