

Syllabus for Astronomy 170 B1, Section 3 - Spring 2020

The Physical Universe

Lectures: Monday, Wednesday, and Friday, 1:00 - 1:50 pm, Room N210 Steward Observatory

Instructor: Prof. John Biegging

Office: 224 Steward Observatory; telephone: 621-4878; email: jbieging@email.arizona.edu

Office hours: Mon 3-4 pm; Tues, Wed, & Thur, 2-3 pm; or by appointment (call or email me)

Teaching assistant: Mr. Erik Wessel; email: ekwessel@email.arizona.edu;

office hours in room 208 Steward Observatory, Mon & Wed 12-1pm (or by appointment---email him)

Text: Bennett, Donahue, Schneider, & Voit, *The Essential Cosmic Perspective, 8th edition*.

Assigned reading: The syllabus lists assigned chapters from the textbook for each of the lectures. I highly recommend that you read the assignment **before** the lecture. The text also has "learning goals" and an introductory paragraph relating the chapter to the themes of the course at the **beginning** of each chapter, and a *summary of key concepts* and set of review questions at the **end** of each chapter. It's a good idea to review these after you've done the assigned reading, and again as you review your notes after the lecture.

Written homework, quizzes: There will be several written homework assignments over the semester. Late homework will not be accepted. In-class quizzes will be given (without prior warning) approximately once per week to encourage attendance and preparation. Missed quizzes may not be made up.

Campus telescope observing: You'll use the 21-inch telescope here on campus (located in the dome across the courtyard from the lecture hall) to observe several celestial objects and will write a report on your observations. Details will be given in a future handout.

Missed examinations can only be made up by *prior* arrangement with Prof. Biegging and for a valid reason (e.g., out-of-town team event), or for a demonstrable emergency (e.g., medical, with doctor's written statement). (A car break-down is not a valid excuse--call a taxi.) In-class quizzes may **not** be made up.

Final Examination: Monday, May 11, 1 pm - 3 pm, in Room N210, Steward Observatory. **(As stated in the Schedule of Classes, there will be no deviations from the published final examination schedule. Plan your post-semester travel accordingly!)**

Course grade: Each of the three midterms will count 10% of the total grade. The final exam counts 20% of the total grade. Written homework will count 15% of the total grade, and the campus telescope observing project will count 15%. In-class quizzes in total will count 20%. Letter grades will be assigned based on your total percentage score as follows: A: 90% or better; B: 80% or better; C: 65% or better; D: 50% or better; E: less than 50%.

Extra Credit: Projects which may be completed for extra credit will be offered. Hand-outs describing the projects will be available at the lectures. Extra credit will be limited to no more than three projects during the semester. One project may be turned in on or before each of three deadline dates during the semester, as indicated in the lecture schedule below. Each extra credit project completed is worth 2.5 additional percentage points out of the total of tests and homework. Extra credit projects will be added to your total test and homework scores (as percentages of a perfect score) to determine your course grade.

Class web site: This course is on the **D2L** web site, which will have the lecture slides in outline form available no later than the day of the lecture. Grades will also be posted there, and other material related to the course.

Course Learning Outcomes

Upon completion of this course, students will be able to:

- understand the nature and application of physical science

- apply ideas and processes beyond the classroom

- recognize the complexity of many scientific issues

- speak and write about scientific knowledge

- appreciate the relative scale of objects, rates of change, linear and nonlinear growth

- critically analyze and interpret data and results presented in tables, graphs and charts as well as perform appropriate mathematical calculations

- read and understand scientific literature from popular sources such as magazines and newspapers

Code of Academic Integrity: Students are encouraged to share intellectual views and discuss freely the principles and applications of course materials. However, graded work/exercises must be the product of independent effort unless otherwise instructed. Students are expected to adhere to the UA Code of Academic Integrity as described in the UA General Catalog. See:

<http://deanofstudents.arizona.edu/academic-integrity/students/academic-integrity>.

Students with Disabilities: If you anticipate barriers related to the format or requirements of this course, please meet with me so that we can discuss ways to ensure your full participation in the course. If you determine that disability-related accommodations are necessary, please register with Disability Resources (621-3268; drc.arizona.edu) and notify me of your eligibility for reasonable accommodations. We can then plan how best to coordinate your accommodations.

Information contained in the course syllabus, other than the grade and absence policy, may be subject to change with advance notice, as deemed appropriate by the instructor. The University is committed to creating and maintaining an environment free of discrimination; see <http://policy.arizona.edu/human-resources/nondiscrimination-and-anti-harassment-policy>

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Class Schedule, Reading Assignments, and Lecture Topics

Dates	Assignment in text	Lecture Topic
Jan 15	Chapter 1	Introduction: Themes of this course
Jan 17, 22	Ch. 2	The visible sky
Jan 24, 27, 29	Ch. 3	Early history of astronomy; Copernicus, Kepler, Galileo
Jan 31, Feb 3	Ch. 4	Newton's universal physics
Feb 5, 7, 10	Ch. 5	Light and Matter; Telescopes and other tools of astronomers
Feb 12	Chs. 1 - 5	Midterm #1
Feb 14, 17	Ch. 6.1, Ch. 7	Intro. to our solar system; the terrestrial planets
Feb 19, 21	Ch. 8	Jupiter, Saturn, Uranus, Neptune
Feb 24, 26	Ch. 9	Pluto, Kuiper Belt Objects
Feb 28	Ch. 9 (cont.)	Asteroids, Meteors, Comets
Mar 2	Ch. 6.2-6.5	Formation of our Solar system
Mar 4	Ch. 10	Other solar systems (Extra Credit #1 due)
Mar 6	Chs 6 - 10	Midterm #2 (<i>spring break: Mar 9-13</i>)
Mar 16, 18	Ch. 11	The Sun
Mar 20, 23	Ch. 12	Stars: properties and patterns
Mar 25, 27	Ch. 13	How stars form and grow old
Mar 30	Ch. 14	How stars die
Apr 1, 3	Ch. 14 (cont.)	White dwarfs, neutron stars and pulsars
Apr 6	Ch. 14.3	General Relativity & Stellar Black holes
Apr 8	Ch. 14.3	Stellar Black holes, cont. & Review (Extra Credit #2 due)
Apr 10	Chs. 11 - 14	Midterm #3
Apr 13, 15	Ch. 15	The Milky Way
Apr 17, 20	Ch. 16.1-16.3	The Universe of Galaxies
Apr 22, 24	Ch. 16.4	Quasars and other monsters
Apr 27, 29	Ch. 17	The Big Bang
May 1, 4	Ch. 18	Cosmology: Dark Matter, Dark Energy
May 6	Ch. 19	Life in the Universe (Extra Credit #3 due)
May 11	(cumulative)	Final Exam (1:00 pm – 3:00 pm)