



Course Number: Physics 1050

Prerequisite: None.

General Education: Satisfies General Education Requirements in PHYSICAL SCIENCE.

Course Description: This course explores the development of our understanding of the origin and evolution of the Universe. We will embark on a qualitative description of the Big Bang theory, the expansion of the universe and its current structure, the cosmic microwave background radiation, the existence of dark matter and dark energy and their implications for the Universe's ultimate fate.

Course Format: 100% online lectures, homework, and exams (through the University of Missouri CANVAS system).

Instructor: Prof. Silvia G. Bompadre, e-mail: bompadres@missouri.edu

Recommended Textbook: *Astronomy: A Beginner's Guide to the Universe*, 8th edition, by Eric Chaisson and Steve McMillan, (Pearson, 2016, ISBN 978-0134087702).

Additional useful books (not required):

Cosmology, The Science of the Universe by E. Harrison (Second edition, Cambridge, 2000).

Astronomy! by W. Montfrooij and L. Ruzhitskaya (Mizzou Publishing, 2014).

Course Content:

The topics covered in this course are divided in 7 Units. Each unit may include one or more chapters of the book and so each unit will include a different number of lectures or homework problems. Take a look ahead so you can pace yourself appropriately.



Course Learning Goals:

After taking this course, students should be able to:

- Describe how the universe was explained in different ages.
- Identify the main contributions of Tycho, Kepler, Galileo, Newton and Einstein.
- Describe the nature of light and electromagnetic radiation and acknowledge how radiation transfers energy and information through interstellar space.
- Describe the scale and structure of the solar system.
- Explain how stellar properties are determined.
- Describe the evolutionary stages of the stars.
- Explain how black holes are formed.
- Describe how galaxies form and evolve.
- Explain the possible nature of dark matter.
- Describe how galaxies are distributed on large scales in the universe.
- Formulate the Cosmological Principle.
- Describe the expanding universe from the Big Bang.
- Explain the importance of the cosmic background radiation.
- Acknowledge the existence of dark energy.
- Elaborate on the fate of the cosmos.

Your performance and grade in this course will be assessed based on:

Homework Assignments:

Online weekly homework consisting of:

1. Multiple-choice questions based on the contents of each unit. You may expect a handful of questions per week, based on the units covered in class.
2. Several question to be answered in a short (1-2 paragraph) free-form “essay”, based on the contents of each unit and/or your interpretation of additional assigned reading/viewing materials.

Feedback: Solutions to the questions will be available at noon the day after the due date. After that, no late homework will be accepted. The graded homework assignments will be posted within 5 days after the due date.

Exams

There will be 2 online exams during the semester, at the end of June and July (check the Course Calendar for details). The exams will have questions similar to those in the homework and will be based on the content of the previous units. Please note that although exam 2 will be centered around the second month set of topics, you may still need to remember and use the concepts learned during the first month!

There will be no final exam.

Make-up exams will be offered only for well-justified cases (clear documentation for why the exam was missed is required). If possible, requests must be made in advance of the exam.

Feedback: The exams grades will be available 4 days after the exam.

Grading Scheme:

Course grades will be given on the plus/minus scale, based on the following scheme:

- Homework: 100 points
- Exams: 200 points (100 points each)
- **Total: 300 points**

Grade Table:

- 0-120 points F
- 121-150 D
- 151-165 C-
- 166-180 C
- 181-195 C+
- 196-210 B-
- 211-225 B
- 226-240 B+
- 241-255 A-
- 256-270 A
- 271-300 A+

Minimum Technology Requirements for this Course:

To complete the course, you will need access to a computer with a modern Web browser, with a working broadband Internet connection. It is possible that on mobile devices such as phones or tablets CANVAS, the online lectures, homework and exams may not work perfectly. Portions of this course may require a PDF reader (e.g., Adobe Acrobat Reader) or Adobe Flash Player.

Additional Notes:

University of Missouri policies on: *Intellectual Pluralism*, *Academic Dishonesty*, *Accessibility for Students with Disabilities*, *Online Netiquette*, and others apply to the course. You can find these policies on the CANVAS course page.

Intellectual Property Notice:

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learning guides, online lecture videos and content, are property of the instructor and University and may not be shared online or distributed in any manner to others. Students are prohibited from posting course materials or notes online and from selling notes to or being paid for taking notes by any person or commercial firm without the express written permission of the professor teaching this course. Doing so will constitute both an academic integrity violation and a copyright violation. Violations of copyright laws could subject you to civil penalties and criminal liability. Violations of academic integrity may subject you to disciplinary action under University policies.