

# Physics 1040: Introductory Astronomy

## Fall 2020 Syllabus

**Lecture Room:** Virtual lectures over Zoom; Tue and Thu 1:30-2:45pm

**Instructor:** Dave Smith, SER Building, Second floor, Room 216  
e-mail: [david.smith@usu.edu](mailto:david.smith@usu.edu)

**Instructor Office Hours:** Tuesday after lectures (3-4 pm)

**Teaching Assistants:** David Soward and Zack Gibson  
E-mail: [phys1040ta@gmail.com](mailto:phys1040ta@gmail.com)  
Virtual office hours: Monday and Thursday 11 am – 12 pm

**Text (REQUIRED):** *ESSENTIAL COSMIC PERSPECTIVE LOOSE-LEAF*, by J. Bennett, M. Donahue, N. Schneider and M. Voit, ISBN: 9780134532455, (8<sup>th</sup> Edition).

**NOTE:**

**Earlier editions of this book are acceptable to use** (but the latest edition will have the most up-to-date information.) We will cover all material necessary for the tests in the lectures.

**Lab Fee:** There is a small lab fee for this class. It covers maintenance and supplies for the Physics Department Observatory. (Note: Some scholarships will not pay for this fee, even though they pay full tuition costs. Scholarship students have been dropped from the class without notice for not paying the fee.)

**Prerequisite:** There are **NO prerequisite classes** for this course. However, as stated in the course catalog, a working ability at the high school mathematics level is expected. This is equivalent to USU Math 0900 and 1010.

**Goals:** This great class will introduce you to many key aspects of astronomy. During the course we will study the heavens as viewed from Earth, our solar system, the Sun, stellar evolution, galaxies, black holes and beyond! Our goal is to help you learn about the fundamentals of astronomy and to experience the universe, as we know it today. This will include how scientists have discovered many amazing facts and how we continue to expand our boundaries of this knowledge. This is an **introductory course** and there is a lot to discover and enjoy as we progress. Your learning experience will be greatly enhanced if you can make time to read the relevant chapter sections prior to each class.

**Disability Resource Center:** USU welcomes students with disabilities. If you have, or suspect you may have, a physical, mental health, or learning disability that may require accommodations in this course, please contact the Disability Resource Center (DRC) as early in the semester as possible (University Inn # 101, 435-797-2444, [drc@usu.edu](mailto:drc@usu.edu)). All disability related accommodations must be approved by the DRC. For example,

disabilities that may limit observing through the telescopes. Once approved, the DRC will coordinate with faculty to provide assistance.

**Honor Code:** The honor code will be strictly enforced in this course. Any suspected violations of the honor code will be promptly reported to the honor system. For more information please visit: <http://studentconduct.usu.edu/studentcode/article6>

### **Course Activities:**

**Lectures:** will focus on basic physics concepts and current astronomical knowledge. Please read appropriate chapter section to aid your learning prior to class. Notes will be posted after class.

**Homework:** will be **weekly**, using **Canvas**. Homework will be due each Wednesday by 5pm (e.g. **HW #1 due Fri 11 Sep by 5pm**). You will do 10 homework assignments; your total homework grade will be determined by your **8 highest scores**.

**Tests:** This course comprises **four tests**. They will all be in the same general format as the homework and will be held online using Proctorio within the Canvas environment. If you aren't familiar with Proctorio, there are several helpful pages within Canvas. Ask TA's for details if needed. The exams are closed book and closed notes and of equal weighting. **No cell or smart phones/watches allowed.**

**Observation Projects:** These are a fun "hands-on" experience and will include the opportunity to learn about the constellations, planets and other deep-space celestial phenomena by observation. These will be conducted individually outside of class time. You will perform **THREE** observation projects during the fall semester:

1. Observing the night-time sky; stars, constellations and moon by eye
2. Observing the Sun; sunspots and flares
3. Viewing deep-space objects; binary stars, nebula, globular clusters, galaxies

**Grading:** Your final grade will be determined as follows:

4 Tests:	50% total
3 Observation Projects:	30% total
14 Homeworks:	20% total (lowest 2 scores dropped)
<b>Grand total:</b>	<b>100%</b>

**Grading Structure:**

- > 92.5 A
- 90.0 - 92.5 A -
- 87.5 - 90.0 B +
- 82.5 - 87.5 B
- 80.0 - 82.5 B -
- 77.5 - 80.0 C+
- 72.5 - 77.5 C
- 70.0 - 72.5 C -
- 67.5 - 70.0 D+
- 60.0 - 67.5 D
- < 60.0 F

**PHYS 1040: Introductory Astronomy Fall 2020 Syllabus**

Week	Date	Lecture	Chapter
<b>Section 1: Night Sky Astronomy and Concepts, Chapters 1-5</b>			
1	Sep 01 03 <b>03</b>	Syllabus Review and quick “Tour of the Universe” Night Sky Motions, Constellations, Seasons <b>Project 1 starts</b>	1 2
2	08 10	Moon Phases, Eclipses, Early Astronomy, Heliocentric System Kepler’s Laws, Newton’s Laws, Conservation Laws	2, 3 4
3	Sep 15 17	Gravity, Orbits, Energy, Light, Electromagnetic Spectrum Astronomy using Temperature, Light, and Spectra	4, 5 5
4	Sep 22 <b>24</b>	Telescopes for Astronomical Measurements <b>Test 1 open</b>	5 1-5
<b>Section 2: Our Solar System, Chapters 6-10</b>			
5	Sep 29 Oct 01 <b>01</b> <b>01</b>	Tour of the Solar System “Nebular Theory” for the Solar System Formation <b>Project 1 Due</b> <b>Project 2 Starts</b>	6 6
6	Oct 06 08	Earth: Structure and Composition The Terrestrial Planets	7 7
7	Oct 13 15	The Jovian Planet Systems Jovian Planets	8 8

8	Oct 20 22	Jovian Moons and Rings Asteroids, Comets, Dwarf Planets	8 9,10
9	Oct 27 <b>29</b>	Extra Solar Planetary Systems <b>Test 2 open</b>	6-10 6-10
<b>Section 3: Stars and Stellar Evolution, Chapters 11-14</b>			
10	Nov 03 05 <b>05</b> <b>05</b>	Our Star the Sun: Interior, Atmosphere, Cycles and Sunspots Fusion and Properties of the Stars <b>Project 2 Due</b> <b>Project 3 Starts</b>	11 11, 12
11	Nov 10 12	Stellar Classifications, H-R Diagram, Birth of Stars The Life and Death of Low and High Mass Stars	12, 13 13
12	Nov 17 <b>19</b>	Stellar Graveyard, White Dwarfs, Neutron Stars, Black Holes <b>Test 3 open</b>	14 11-14
<b>Section 4: Galaxies and Cosmology, Chapters 15-18</b>			
13	Nov 24 26	Our Galaxy the “Milky Way”, and What Lies at its Center No Class (Happy Thanksgiving!)	15 -
14	Dec 01 03 <b>03</b>	Galaxies Everywhere! Their Classification and Evolution Active Galaxies, Quasars, Radio Galaxies, Hubble’s Law <b>Project 3 Due</b>	- 16
15	Dec 08 10	Cosmology: The “Big Bang Theory” and its Evidence Dark Matter, Dark Energy and the Fate of the Universe	17 18
	<b>Dec 10</b>	<b>Final Test: Testing Center Dec 9<sup>th</sup> (provisional)</b>	15-18

Homework due each Friday by 5pm (no homework first week).