Astronomy 110

This course is an introduction to astronomy and astrophysics. Astronomy is the study of the motions of the objects in the sky, whereas astrophysics is the study of the natural processes creating those objects. This course will discuss what is out there, but also the fundamentals of chemistry and physics behind the scenes.

The reference digital text ***Openstax: Astronomy*** will be used as the course textbook. We will not be covering the sections of the book in order, nor all of them. Many concepts in science overlap with each other, so information from one unit can be important in other units. Consistent review is essential to success. This course is new and is fast, but some units may have their length adjusted or omitted depending on available time.

1 Radiation and Spectra: Chapter 5 & NASA Resource
2 Orbits and Gravity: Chapter 3
3 Astronomical Instruments: Chapter 6
4 Observing the Sky: Chapter 2
5 The Sun – A Garden Variety Star: Chapter 15
6 The Sun – A Nuclear Powerhouse: Chapter 16
7 Analyzing Starlight: Chapter 17
8 The Birth of Stars and the Discovery of Planets Outside the Solar System: Chapter 21
9 Stars from Adolescence to Old Age: Chapter 22
10 The Death of Stars: Chapter 23
11 Black Holes and Curved Spacetime: Chapter 24
12 The Milky Way Galaxy: Chapter 25
13 Galaxies: 26
14 Active Galaxies, Quasars, and Supermassive Black Holes: Chapter 27
15 The Evolution and Distribution of Galaxies: Chapter 28
16 The Big Bang: Chapter 29

Projects

A project may be asked of the students. If so, detailed grading will be shared at that time.

Assessment and Evaluation

Outcomes (units) will be graded from 1 to 6. That grade will be based on evidence from multiple sources including all or some of the following: observations, conversations, formative, and summative assessments.

Expert: Demonstration of a deep/thorough understanding of the concept	**6**	• Chose an appropriate strategy. • Successfully applied the necessary background skills and proper concepts to complete solutions. • Solutions contained no minor mistakes, or a summative contains at most two. • Clearly and concisely explained how to solve the problem using appropriate vocabulary, diagrams, and a coordinate system. “Did I show my work?” • Evaluated the reasonableness of my answer. “Does this make sense for the situation?” • Concept understood to a high degree to teach it to someone else. • **Concept can be applied to new problems.**
	5	• Chose an appropriate strategy. • Solution(s) contained an error(s) related to a background skill. • The concept can be explained using appropriate vocabulary. • **The concept can be applied successfully in known problems.**

Apprentice: Good/Satisfactory understanding of the concept	**4**	• Chose an appropriate strategy. • A solution contained a concept error. A summative contained at most two such errors. • Minor mistakes and background skill errors are common. • Explanations of a problem contained *mostly* appropriate terminology. • Mistakes were identified and corrected after referring to a key. • **More practice is needed solving this type of problem**.
	3	• Chose an appropriate strategy. • Solution(s) contained a combination of concept errors, errors related to background skills and minor mistakes. • A lack of necessary background skills to solve problems. • Notes, examples, or help was needed to solve problems. • Explanations did not contain proper terminology. • **Help from an expert is required solving this type of problem**.
Novice: Minimal-to-no understanding of the concept	**2**	• Incorrect strategy(ies) chosen for a problem(s). • Step-by-step instructions are required to solve problems. • Tasks could not be performed to an acceptable standard. • **Consistent extra help from an expert is required**.
	1	• Basics of what was needed to solve the problem was not known. • Solution left blank; first step not known. • **Teaching by an expert is required**.

Learning Category	**Classification Level**	**Only shortly before report cards will a percentage mark be determined**		
Expert	6	95 – 100		
	5	86	90	94
Apprentice	4	73	80	85
	3	60	66	72
Novice	2	50	56	59
	1	0	25	49

Students will log their grades, The overall grade is guided with the calculation of the *median* and *mean* of all grades.

*Reassessing outcomes is encouraged, and times will be made available during the semester.
*No traditional final exam. Reassessment is possible.

Overall Course Grade

- Calculate your *median* by arranging your grades from lowest to highest. The grade in the middle is *likely* your overall grade. If there is no exact middle number, average the two middle numbers.
- Calculate your mean by adding all the grades up and divide by how many there are.
- Use a pencil, if you are writing your grades here because grades will fluctuate over the semester.

Median = _____ Mean = _____

Example Percent Determinations

Median	Mean	Percent	Reason
4	3.8 – 4.2	80 %	Median and mean match or are close
4	4.3 or higher	85 %	Mean is much higher than median
4	3.7 or lower	73 %	Mean is much lower than median