

## Abilene Approval Chart for Curriculum Changes

A = Approve      I = Information Item      R = Respond in Writing

Course Number PHYS 101 or Degree Plan(s) \_\_\_\_\_

State the requested change and reason. A memo may be attached if more space is necessary.

We would like to add PHYS 101 Astronomy, to the menu for the Life and Physical Sciences in the University Requirements. Explanation and justification is provided in the attached application.

Indicate the requested change.

|     | Change to a Course                                   | Dept./School <sup>1</sup> | College | Dean | TEC | UGEC | AUAC/Grad | Provost | President |
|-----|------------------------------------------------------|---------------------------|---------|------|-----|------|-----------|---------|-----------|
| 1.  | Title (description unchanged)                        | A                         | A       | A    | I   | -    | I         | I       | I         |
| 2.  | Description (not affecting content)                  | A                         | A       | A    | I   | -    | I         | I       | I         |
| 3.  | Course term(s)                                       | A                         | I       | A    | I   | -    | I         | I       | I         |
| 4.  | Content (change of course outcomes)                  | A                         | A       | A    | I   | -    | I         | A       | I         |
| 5.  | Number of hours (lecture, lab, contact)              | A                         | A       | A    | A   | -    | A         | A       | I         |
| 6.  | Course number within the hundred                     | A                         | A       | I    | I   | -    | I         | I       | I         |
| 7.  | Course number beyond the hundred                     | A                         | A       | A    | A   | -    | A         | A       | I         |
| 8.  | Prerequisites                                        | A                         | A       | A    | I   | -    | I         | I       | I         |
| 9.  | Course fee(s)                                        | A                         | -       | A    | -   | -    | -         | A       | I         |
| 10. | From U to G or G to U                                | A                         | A       | A    | A   | -    | A         | A       | I         |
| 11. | Cross-list course                                    | A                         | A       | A    | A   | -    | A         | A       | I         |
| 12. | Department of record                                 | A                         | A       | A    | A   | -    | A         | A       | I         |
| 13. | Close a course                                       | A                         | A       | A    | A   | -    | A         | A       | I         |
| 14. | New course (includes combining or splitting courses) | A                         | A       | A    | A   | -    | A         | A       | I         |

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|     | Change to the University Requirements<br>(All Campuses)                                                    | Dept./School <sup>1</sup> | College | Dean | TEC | UGEC | AVAC/Grad | Provost | Faculty | President | Trustees |
|-----|------------------------------------------------------------------------------------------------------------|---------------------------|---------|------|-----|------|-----------|---------|---------|-----------|----------|
| 1.  | University Requirements — Change course outcomes of an included course <sup>2</sup>                        | A                         | A       | A    | —   | A    | —         | A       | —       | A         | —        |
| 2.  | University Requirements — Add or drop a required course from the University Requirements <sup>2</sup>      | A                         | A       | A    | —   | A    | —         | A       | A       | A         | —        |
| 3.  | University Requirements — Add or drop a course from a menu within the University Requirements <sup>2</sup> | A                         | —       | —    | —   | A    | —         | A       | —       | A         | —        |
| 4.  | University Requirements — Change hours within a menu in the University Requirements <sup>2</sup>           | A                         | A       | A    | —   | A    | —         | A       | A       | A         | —        |
|     | <b>Change to Catalog Information<br/>(for Campus)</b>                                                      |                           |         |      |     |      |           |         |         |           |          |
| 1.  | General Requirements for Bachelor's Degrees and Associate's Degrees                                        | —                         | —       | —    | —   | —    | A         | A       | A       | A         | —        |
| 2.  | Policies governing academic probation and suspension                                                       | —                         | —       | —    | —   | —    | A         | A       | A       | A         | —        |
| 3.  | Requirements for graduating with honors                                                                    | —                         | —       | —    | —   | —    | A         | A       | A       | A         | —        |
|     | <b>Change to a Degree Plan<br/>Proposed by Faculty or College</b>                                          |                           |         |      |     |      |           |         |         |           |          |
| 5.  | Educational Program — Revise <sup>3</sup>                                                                  | A                         | A       | A    | A   | —    | A         | A       | —       | A         | —        |
| 6.  | Educational Program — Adopt/change admission requirements                                                  | A                         | A       | A    | A   | —    | A         | A       | —       | A         | —        |
| 7.  | Educational Program — Add <sup>3</sup>                                                                     | A                         | A       | A    | A   | —    | A         | A       | A       | A         | I        |
| 8.  | Educational Program — Discontinue                                                                          | A                         | A       | A    | A   | —    | A         | A       | A       | A         | I        |
| 9.  | GPA — Revise program-required GPAs                                                                         | A                         | A       | A    | A   | —    | A         | A       | —       | A         | —        |
| 10. | Minor — Revise                                                                                             | A                         | A       | A    | I   | —    | I         | I       | —       | I         | —        |
| 11. | Minor — Add                                                                                                | A                         | A       | A    | A   | —    | A         | A       | —       | A         | —        |
| 12. | Minor — Discontinue                                                                                        | A                         | A       | A    | A   | —    | A         | A       | —       | A         | —        |
| 13. | Degree — Add                                                                                               | A                         | A       | A    | A   | —    | A         | A       | A       | A         | I        |
| 14. | Degree — Discontinue                                                                                       | A                         | A       | A    | A   | —    | A         | A       | A       | A         | I        |
|     | <b>Change to a Degree Plan<br/>Proposed By Provost</b>                                                     |                           |         |      |     |      |           |         |         |           |          |
| 15. | Educational Program — Discontinue                                                                          | R                         | —       | R    | A   | —    | A         | A       | A       | A         | I        |
| 16. | Minor — Discontinue                                                                                        | R                         | —       | R    | A   | —    | A         | A       | —       | A         | —        |
| 17. | Degree — Discontinue                                                                                       | R                         | —       | R    | A   | —    | A         | A       | A       | A         | I        |

<sup>1</sup> When an academic unit does not have a council, the UGEC and/or UUAC will serve as its academic council, depending on the nature of the issue.

<sup>2</sup> Courses that satisfy ACU's University Requirements will normally have lower-level numbering, be free of prerequisites and co-requisites, appeal to more than one or two majors, and "not narrowly focus on those skills, techniques, and procedures specific to a particular occupation or profession" (SACS 2.7.3). Departments may request exceptions to the first three criteria.

<sup>3</sup> For undergraduate majors, a minimum of 30 hours is required. These programs must have a minimum of 6 elective hours, unless the requirements of external accrediting bodies make it impossible.

Revised 8-29-22

|                                                                                                |                          |
|------------------------------------------------------------------------------------------------|--------------------------|
| <b>Department/School Chair(s)</b>                                                              |                          |
| <br>Signature | 9/14/22<br>Approval date |
| _____<br>Signature                                                                             | _____<br>Approval date   |

|                                    |                        |
|------------------------------------|------------------------|
| <b>College Academic Council(s)</b> |                        |
| _____<br>Signature                 | _____<br>Approval date |
| _____<br>Signature                 | _____<br>Approval date |

|                    |                        |
|--------------------|------------------------|
| <b>Dean(s)</b>     |                        |
| _____<br>Signature | _____<br>Approval date |
| _____<br>Signature | _____<br>Approval date |

|                                  |                        |
|----------------------------------|------------------------|
| <b>Teacher Education Council</b> |                        |
| _____<br>Chair's signature       | _____<br>Approval date |

|                                             |                        |
|---------------------------------------------|------------------------|
| <b>University General Education Council</b> |                        |
| _____<br>Chair's signature                  | _____<br>Approval date |

|                                               |                        |
|-----------------------------------------------|------------------------|
| <b>Abilene Undergraduate Academic Council</b> |                        |
| _____<br>Chair's signature                    | _____<br>Approval date |

|                            |                        |
|----------------------------|------------------------|
| <b>Graduate Council</b>    |                        |
| _____<br>Chair's signature | _____<br>Approval date |

|                    |                        |
|--------------------|------------------------|
| <b>Provost</b>     |                        |
| _____<br>Signature | _____<br>Approval date |

|                                  |                        |
|----------------------------------|------------------------|
| <b>Faculty</b>                   |                        |
| _____<br>Chair of Faculty Senate | _____<br>Approval date |

|                    |                        |
|--------------------|------------------------|
| <b>President</b>   |                        |
| _____<br>Signature | _____<br>Approval date |

# Application for Life and Physical Sciences Menu

## Guidelines For All General Education Courses

1. All general education courses must be 100-level or above.
2. General education courses should present a breadth of knowledge, not focusing on skills, techniques, and procedures specific to a particular occupation or profession.
3. Individual courses will fulfill only a single general education requirement.
4. Courses free of prerequisites are preferred. Applications to add courses with prerequisites must provide additional evidence that the course contributes to a student's breadth of knowledge and is not specific to a particular occupation or profession.
5. Each course may appear on a maximum of two menus that accept applications (arts and humanities, cultural literacy, life and physical sciences, and social and behavioral sciences).

## Life and Physical Sciences Description

Courses within this domain use the methods and models of the natural sciences to describe, explain, and predict phenomena in the physical world; they employ empirical evidence, scientific principles, and interactions among natural phenomena to understand the world around us.

## Instructions

Complete this form and submit it with a course syllabus and approval chart to the University General Education Council. Faculty submitting an application should be prepared to perform annual assessment for their course. The assessment will be conducted with the rubric included in this course application.

|                                                            |                                                                                                                                                                                                                                                    |
|------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Subject code, course number, and title of course:</b>   | PHYS 101, Astronomy                                                                                                                                                                                                                                |
| <b>Terms offered:</b>                                      | Fall and Spring                                                                                                                                                                                                                                    |
| <b>Catalog description:</b>                                | Covers history, development, observational techniques, solar, planetary, stellar, galactic, and cosmological aspects of astronomy. Requires some observation and lab work. May be used to satisfy University Requirements. For non-science majors. |
| <b>Course prerequisites:</b>                               |                                                                                                                                                                                                                                                    |
| <b>Cross-listed courses:</b>                               |                                                                                                                                                                                                                                                    |
| <small>*Note: Many gen ed courses are cross-listed</small> |                                                                                                                                                                                                                                                    |

|                                                                                           |  |
|-------------------------------------------------------------------------------------------|--|
| between the Abilene and Dallas campuses.                                                  |  |
| <b>Other general education menus on which the course appears or you are applying for:</b> |  |

## Prerequisites

The council understands that many of the courses on this menu will have corequisites and that the second course in a sequence may also have a prerequisite.

1. Is the course a lower-division (100- to 200-level) course in astronomy, biology, chemistry, physics, agricultural science, environmental science, or geology?  
☒ Yes                      ☐ No

If yes, continue to 2. If no, please explain how this course meets the description of life or physical sciences above. Applications for courses originating in other disciplines will be considered.

2. Does the course have more than one prerequisite and/or more than one corequisite?  
☐ Yes                      ☒ No

If no, continue to 3. If yes, please explain why an exception should be made to include this course in the Life and Physical Sciences menu.

3. If the course has prerequisites, provide evidence that the course contributes to a student's breadth of knowledge. Also provide evidence that the course content is not specific to a particular occupation or profession (200 words or less).

## Relevant Outcomes

- C2: Analyze quantitative data, published writing, or observable phenomena to draw informed conclusions.
- C3: Interpret mathematical and/or logical models such as formulas, graphs, tables and schematics, and draw inferences from them; and
- C4: Integrate new data into their existing knowledge.

**Describe how the course meets the C2 outcome (100 words or less).**

Students are introduced to the field of astronomy and the published explanations of how many things in our universe work. They also must do their own personal observations of some phenomena and analyze those to report what they saw.

**Describe how the course meets the C3 outcome (100 words or less).**

Many of the concepts are described using formulas, graphs, and diagrams. Orbital motion of planets, trends in planetary atmospheres, stellar life-cycles, etc. Many concepts also have students look at how the models change depending on the size of the planet or star and how that leads to different distinct population groups.

**Describe how the course meets the C4 outcome (100 words or less).**

Most of the concepts introduced in this course are new to the student. They likely have observed many things discussed in the course like the moon, sun, planets, and stars, but they are expected to add significantly to that knowledge during this course. We also look at the accepted scientific explanations for the origin of our universe and ask our students to integrate that with their own views of that origin.

Outcomes assessment should occur within one or two exams/assignments. Please indicate which exams or assignments will be used for each outcome. Provide assignment prompts if available.

| Area to Be Assessed | Assessment Artifact                  |
|---------------------|--------------------------------------|
| Outcome C2          | Astronomy Workbook                   |
| Outcome C3          | Lecture Tutorial or other assignment |
| Outcome C4          | Lecture Tutorial or other assignment |

Workbook will assess the sunrise/sunset observation where students are asked to observe and draw the location of the sun at sunrise or sunset over a 2 week period.

We will use the *Lecture-Tutorials for Introductory Astronomy* 3<sup>rd</sup> edition workbook by Prather, Slater, Adams, and Brissenden. A lecture tutorial that makes significant use of graphs and/or tables will be selected. There are many of these but each professor chooses different ones to support their course learning. The same tutorial will be used to evaluate both C3 and C4 as all this material is new to these students.

Please use the following rubric to perform assessment each year.

### Student Learning Outcome C2

| Students will be able to:        | Shortcomings                                            | Meets Expectations                                             | Points of Excellence                                           |
|----------------------------------|---------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------|
| Analyze data to draw conclusions | Lacks sufficient analysis of data or published writing. | Analyzes data and/or published writing in an effective manner. | Analyzes data and/or published writing in an exemplary manner. |

The average grade for each student workbook will be used. Those scoring 70% or below will be in the Shortcomings category, scores from 70-90% will be in Meets Expectations, and those above 90% will be Points of Excellence.

### Student Learning Outcome C3

| Students will be able to:                                      | Shortcomings                                                                        | Meets Expectations                                                     | Points of Excellence                                                  |
|----------------------------------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------|-----------------------------------------------------------------------|
| Interpret mathematical and/or logical models such as formulas. | Little to no demonstrated ability to interpret relationships and/or data in models. | Demonstrates ability to interpret relationships and/or data in models. | Exceptional ability to interpret relationships and/or data in models. |

Problems related to graphs, diagrams, and models will be graded and averaged. Those scoring 70% or below will be in the Shortcomings category, scores from 70-90% will be in Meets Expectations, and those above 90% will be Points of Excellence.

## Student Learning Outcome C4

| Students will be able to:                        | Shortcomings                                                                                                      | Meets Expectations                                                 | Points of Excellence                                                                                          |
|--------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| Integrate new data into their existing knowledge | Shows little to no grasp of new information and/or does not demonstrate adequate connection to previous learning. | Grasps new information and makes connections to previous learning. | Exceptional grasp of new information and/or demonstrates outstanding ability to connect to previous learning. |

The overall score of the selected assignment will be used. Those scoring 70% or below will be in the Shortcomings category, scores from 70-90% will be in Meets Expectations, and those above 90% will be Points of Excellence.

# Physics 101.01– Astronomy Syllabus

**Prof:** Dr. Larry Isenhower

**email:** ldi00a@acu.edu

**Phone:** 325-674-2165

**office:** Onstead Science Center rm 123E

**Office hours:** MWF 1-2 pm, TR 1-3 pm, other times by appointment

## Mission of Abilene Christian University

The mission of Abilene Christian University is to educate students for Christian service and leadership throughout the world.

### Texts:

*Lecture-Tutorials for Introductory Astronomy* 3<sup>rd</sup> Edition by Prather, Slater, Adams, and Brissenden

*Observation Workbook* – purchased in class from ACU Society of Physics Students

*Astronomy* by Andrew Fraknoi, David Morrison, and Sidney C. Wolff

free pdf available at: <https://openstax.org/details/books/astronomy>

You **must** have the Lecture-Tutorials and Observation Workbook. We will do some worksheets in class and your homework assignments are in the other.

Much of the course material will come from the *Astronomy* text but significant portions will come from other sources cited in class and may also be posted on Canvas before class time.

### Grading:

|     |                                                       |
|-----|-------------------------------------------------------|
| 10% | Class participation and attendance                    |
| 30% | Observation workbook and other observation activities |
| 30% | In-class assignments and quizzes                      |
| 30% | Project                                               |

Final grades follow the normal expectations: 90.0-100% is an A, 80.0-89.9% is a B, 70.0-79.9% is a C, 60.0-69.9% is a D, and less than 60.0% is an F.

### Class Participation and Attendance:

You are expected to attend class. This class is being designed with more activities and homework being done in class. If you miss a class you will need to make up any assignments completed that day. If you know you need to miss a class, please inform me before that day so that I can help you know what you need to do for the day you missed.

There is a grade bonus available to your In-class assignments and quizzes part of your grade for maintaining good attendance.

#### Attendance Bonus:

|                         |                                  |
|-------------------------|----------------------------------|
| No un-excused absences: | 200 points (equal to ~2 quizzes) |
| 1 un-excused absences:  | 100 points (equal to ~1 quiz)    |

2 un-excused absences: 50 points (~half a quiz)

Roll is taken using quizzes in canvas and through assignments turned in during class. If you miss a quiz due to technical error or forgetfulness email me or the TA immediately so we can fix it. If you are late tell the TA as you come in. Your class participation grade will be reduced for more than 5 unexcused absences.

**Attendance Class Participation Deduction:**

|              |                                                 |
|--------------|-------------------------------------------------|
| 6 un-excused | 10% deduction (1 point on final overall grade)  |
| 7 un-excused | 20% deduction (2 points on final overall grade) |
| 8 un-excused | 30% deduction (3 points on final overall grade) |
| 9 un-excused | 50% deduction (5 points on final overall grade) |

**Observation Workbook:**

This workbook is purchased from the Engineering and Physics department in Onstead Science Center room 113 for \$10. The activities and lab material are made easier using the Star Walk app though other planetarium programs exist that can do the desired tasks. (Stellarium for PC/Mac and other phone/tablet apps) Many of these activities can be done immediately and turned in soon so you do not need to worry about them later (A, C, D, E, F, and G) Only activity B must be done during a specific time frame.

**Activity A** – involves observing and describing details of a prominent constellation.

**Activity B** – involves sketching the location of the sun at sunrise or sunset every other day for 2 weeks. You will need to know what time sunrise or sunset is. The Star Walk app can tell you along with many other sources. Must be done during the date window stated in the instructions.

**Activity C** – involves watching how a shadow changes and can be done on any sunny day.

**Activity D** – involves observing 10 different star constellations.

**Activity E** – involves looking at spectra of a few lights using household materials

**Activity F** – involves sketching the position of the moon every other day for 2 weeks at the same time of day i.e. 8pm. Details on when to start are given in the instructions

**Activity G** – Is an AISD planetarium visit. Costs \$2

**In-class Assignments and Quizzes:**

Most of our classes will involve some sort of activity or assignment. This may be something done on paper, in Canvas, or some other technology. This will primarily be graded on participation not right/wrong as long as a reasonable attempt is made at giving a complete answer to the questions/activities. We will also have quizzes to check retention of knowledge from previous classes or activities just completed. These will be graded based on whether you get the correct answer or not.

**Project:**

The basic goal of this project is to give you an opportunity to see what it is like to do science research first hand. This will give you a better idea of what the scientific process looks like and let you study a specific topic in greater detail which I hope will let you gain a deeper

appreciation of that topic. I also hope that you will realize that everyone can do science not just people with Ph.D. degrees. This semester long project will be broken into several different assignments posted within Canvas so that I can provide feedback to you to improve your writing skills and understanding of how scientific observation and writing should be done.

For this project you will write a report about a series of personal observations either made directly or through accessing publicly available data from NASA/ESA/etc. The paper needs to be at least 1000 words long. In this paper you will discuss what you wanted to observe, why you were interested in observing that thing, how you did the observation(s), and what did you learn about the thing from your observations. I also want to see a short section (50-150 words, roughly 1 paragraph) describing what astronomers know about the thing you observed with an appropriate citation to the source(s) you used.

**Please note:** This paper is **not** a research paper. I want to read about what **you** did and what **you** learned from that and how it impacted **you**. Only about 10% of the paper is a research paper, i.e. the one paragraph you write telling me about what astronomers have learned from their observations of what you observed. Examples of what I considered good papers are posted in Canvas.

#### **Class Behavior:**

There are several ways I expect to have your attention during class. These involve the lecture-tutorials, classroom activities, and question responses. Computers/tablets/smartphones will only be used during activities requiring them. Most classroom activities will require the use of an internet device and these will be allowed at those times.

This classroom is very large and there are many students so please be respectful of others around you. Questions addressed to the whole class are strongly encouraged because most likely you are not the only one confused. If you know you are easily distracted it is better to sit towards the front so there are fewer people in front of you.

If I notice you purposely ignoring the lecture or disturbing other students e.g. listening to headphones, talking, sleeping, etc. I will give you a verbal warning. If I need to give you a second warning that day you will be given an unexcused absence for the day and may be asked to leave. Please be an adult and respect others around you.

#### **Academic Integrity:**

Academic integrity is defined as academic work completed as assigned for each class by the individual or group responsible for the work. Violations of academic integrity and other forms of cheating involve the intention to deceive, mislead, or misrepresent and therefore, are a form of lying. Such actions are contrary to behavioral norms that flow from the nature of God. Academic misconduct includes, but is not limited to, the following: 1) Failing to give credit to sources used in a work in an attempt to present the work as one's own, 2) Submitting papers or projects obtained from another source (e.g., research service or club paper file) as one's own, 3) Falsifying information orally or in writing, and 4) Receiving, giving, or using unauthorized aid on an examination or quiz. Academic

misconduct may result in, but is not limited to, a zero on the assignment and/or an F in the course. Additionally, the department chair, Dean of the College of Arts and Sciences, and the Dean of Student Life will be notified. See the full university policy, including how to appeal a decision, by following this link:

<http://www.acu.edu/community/offices/administrative/office-of-the-provost/academic-integrity-policy.html>

#### **ADA Compliance Policy:**

Abilene Christian University is dedicated to removing barriers and opening access for students with disabilities in compliance with ADA and Section 504 of the Rehabilitation Act. The Alpha Scholars Program facilitates disability accommodations in cooperation with instructors. In order to receive accommodations, you must be registered with Alpha Scholars Program, and you must complete a specific request for each class in which you need accommodations. If you have a documented disability and wish to discuss academic accommodations, please email [alpha@acu.edu](mailto:alpha@acu.edu) call our office directly at 325-674-2667.

#### **Anti-Harassment Policy:**

Consider adding the following text from the harassment policy of ACU:

"As a Christian community, Abilene Christian University has committed itself, unequivocally, to ensuring a working and learning environment in which the dignity of every individual is respected. Harassment is defined as unwelcome behavior or conduct based on sex, religion, race, age, color, national origin, veteran's status, disability, or any other characteristic protected by law when (1) submission to such conduct is made either explicitly or implicitly a term or condition of an individual's employment, education, or participation in University programs or activities, (2) submission to, or rejection of, such conduct by an individual is used as the basis for a decision affecting an individual's employment, education, or participation in University programs or activities, or (3) such conduct has the purpose or effect of unreasonably interfering with an individual's work or academic performance or creating an intimidating, hostile, or offensive environment for work, education, or participation in a University program or activity. See the full university policy by following [this link](#).

#### **Note:**

This syllabus is as accurate as possible at this time; however, it may be necessary to change certain aspects to improve the course or address concerns arising during the semester. These changes will be announced via email and canvas since we do not have official class meetings.