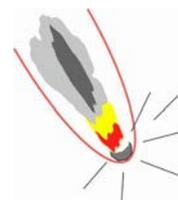


PHYS 103 Elementary Astronomy  
Syllabus Sec 001  
Spring 2021

Astronomy answers the basic question "What is our place in the Universe?" As the oldest of the sciences, it offers many examples of how science works. As a science that takes the entire universe as its subject matter, it incorporates and applies all of the other sciences. You will learn how the combination of measurements and well-tested models makes it possible to know things that we could never experience directly. We know the distance to the center of the Earth even though no one has ever gone there. Similarly, we know the temperature and chemical composition of the center of the Sun and many other seemingly impossible things. You will learn how very special life on Earth is when we discuss the conditions that might be required for life elsewhere. You will learn ways to think rationally about unlikely but terrifying events such as asteroid impacts. You will learn the power of the basic laws of motion that come from physics when we discuss the motion of planets and the prediction of asteroid impacts. You will learn the origin of the Sun's energy and you will learn how life on Earth uses that energy.



**Course Objectives:** After taking this course, you will:

1. Be able to think critically about the processes and results of science.
2. Know the science behind events such as climate change, earthquakes, and asteroid impacts, that can affect the entire Earth and be able to apply this knowledge to matters of public discussion.
3. Know how life on Earth reproduces and be able to apply this knowledge to discussions about the search for life elsewhere.
4. Be able to use formulas to calculate such things as the distances to stars and the risk implied by an asteroid impact prediction.
5. Be able to use a graphical representation of data to understand the life histories of stars.
6. Be able to ask questions about science and judge the accuracy of information about science.

**Instructor:** Robert H. Gowdy,

701 W. Grace St., Room 2411, Telephone 828-1821, email [rgowdy@vcu.edu](mailto:rgowdy@vcu.edu)

Office hours – Send an email to set up a ZOOM session.

**Lecture Schedule:** MWF 7:30am – 11:59pm

**Room:** ONLINE.

**Required Item:** Top Hat Pro (1 year \$48 online)

**Required Item:** Packback Questions Subscription (\$25 for the semester)

**Required Textbook:** Elementary Astronomy by Robert H. Gowdy (\$60 in Top Hat Marketplace)

**Last Day to Drop:** February 8, 2021

**Last Day to Withdraw with a W:** May 7, 2021.

## Overview of How the Course Works

The course will be taught from materials that are available through your Top Hat account. It is important to read each **chapter** of the textbook *before* we cover it in lecture. In order to encourage you to do that, each chapter contains questions, which are assigned as homework with a due date. To get homework credit, you must answer the questions before the due date for each chapter. Each multiple-choice response gets half credit for the response and half credit for correctness. Each discussion question gets full credit for participation. The percentage of possible credit becomes your “**homework score.**”

**Lectures** will be assigned on Top Hat on the days that the course “meets.” A new lecture will be assigned at 7:30am each Monday, Wednesday, and Friday. After each main point in the lecture, there will be a multiple-choice question about it. Each response that is made on the day of the lecture gets half credit for participation and half credit for correctness. The percentage of possible credit becomes your “**Top Hat response score**” for that lecture. Lectures will remain available for review after the day they are first assigned, but you have to answer the lecture questions before midnight on the day that the lecture is assigned.

The **Packback Questions** site (NOT part of Top Hat) uses an AI-powered computer algorithm to assign “**curiosity scores**” to your posts on that site. These scores encourage you to ask complex questions that do not have simple answers and to give thoughtful and well-documented answers. In addition to responding to lectures, you are required to post questions and answers on Packback Questions. Post at least **one substantial question** (more than 30 curiosity points) about the course material and at least **two substantial responses** (more than 30 curiosity points) each week to obtain a 100% **posting score** for the week.

Each week I add up your Top Hat response scores and your Packback curiosity scores to produce your **engagement total for the week**. Because I just add these scores together, you can use Packback scores to make up for missing Top Hat responses or quizzes. The Engagement section of the Syllabus gives the detailed procedure for calculating your engagement score from the total.

The lectures cover a great deal of detailed information that you are expected to understand. Online, open-book Multiple-choice exams will assess how much you understand and provide your **assessment score**. The Assessment section of the syllabus gives the detailed procedure for calculating your assessment score.

Your **overall score determines your final grade:**

**Overall score = 10% Homework + 10% Posting + 15% Engagement + 65% Assessment + extra credit**

**A=90.0-100.0, B=80.0-89.9, C=69.5-79.9, D=59.5-69.4**

Note: Weekly posts in the Packback Questions Discussion Forum are **required** and impact 25% of your overall grade.

## Websites

**Blackboard Website:** Our course has a website on Blackboard. There you will find a summary of your grades, Previews of exams and access to the optional, extra credit Moon Observing Project.

**Top Hat:** We will be using the Top Hat ([www.tophat.com](http://www.tophat.com)) platform to support our online course. You will be able to study, submit answers to lecture and chapter reading homework questions, and take exams using Apple or Android smartphones and tablets, as well as internet-connected computers of any type. We will be using the custom-built interactive Top Hat Textbook “Elementary Astronomy” for this class. At the top of the Assignments page of your Top Hat account you will find a link to a copy of this syllabus, a link to a summary of due dates, and links to an optional, extra credit Science Literacy Exam.

**Visit the Top Hat Overview** (<https://success.tophat.com/s/article/Student-Top-Hat-Overview-and-Getting-Started-Guide>) within the Top Hat Success Center which outlines how you will register for a Top Hat account, as well as providing a brief overview to get you up and running on the system.

An invitation will be sent to you by email, but if you don't receive this email, you can register by simply visiting our **Top Hat course website**: Unique Course URL:  
<https://app.tophat.com/e/445512>

- Note: our Course Join Code is **445512**.
- VCU will require you to use your VCU eID to register.
- Top Hat will require a paid subscriptions for Top Hat – one year for \$48.
- Your “Elementary Astronomy” interactive textbook will be applied at checkout for \$60. You will see “preview” versions of all the textbook chapters right away. The full versions, with interactive questions for homework, will be assigned later.
- If you need to be reimbursed from financial aid, purchase account codes at the bookstore and use those to register for Top Hat, Top Hat Test, and the textbook.

Should you require assistance with Top Hat at any time, please contact their Support Team directly by way of email ([support@tophat.com](mailto:support@tophat.com)), the in app support button, or by calling 1-888-663-549.

Be sure to download the **Top Hat app** on your cell phone (or other mobile device). Top Hat runs very well on even the dumbest of smart phones, so you can study or do homework when you do not have your computer handy. You will also have a handy backup if your computer breaks down or is stolen.

**To use a computer to access Top Hat**, just go to their website [www.tophat.com](http://www.tophat.com), and log on. Be sure to use either Chrome or Firefox as your web browser. The browsers that computers often default to, such as Edge and Safari, will not work well with Top Hat.

**Packback Questions:** We will be using the Packback Questions platform for online discussions about science. Weekly posting is **required**. Questions related to topics covered in this course are preferred, but you can also ask other science-related questions that you are curious about.

Before you start posting, be sure to read the [Community Guidelines](#) found in the tutorial on Packback. If your post doesn't follow the Packback Community Guidelines, there is a chance it will be removed and you won't receive points for that post.

The deadline for posting to your community each week is **Saturday at 11:59 pm**.

**Note:** it takes 24 hours for the Packback team to moderate a post and send a coaching email. If for any reason your post is moderated because it does NOT meet the Community Guidelines, you will need to edit and re-publish your post to receive credit for the week. That is why it is important that you complete your Packback questions and responses well before the deadline in case your post is moderated.

**Register by following the instructions below:**

1. **Navigate to <https://questions.packback.co/sign-up/create-account>.**  
Note: If you already have an account on Packback you can login with your credentials.
2. **Make sure to register with the ...@vcu.edu form of your email address and the same form of your name that you used to register for the class.**
3. **Enter our class community's access code into the "Join a new Community" module on your dashboard. Our Community access code is:  
f501244a-5a0b-4f4b-8611-11e79ebffbc3**
4. **Follow the instructions on your screen to finish your registration.**

**If you have ANY questions or concerns regarding Packback throughout the semester, please contact the customer support team at [holla@packback.co](mailto:holla@packback.co)!**

For a brief introduction to Packback Questions and why we are using it in class, watch this video: [vimeo.com/packback/Welcome-to-Packback-Questions](https://vimeo.com/packback/Welcome-to-Packback-Questions)

## Course Work

### Homework

Reading assignments and due dates are given in the table below and reminders will be given on the Announcements page of our Blackboard Website. Answer all of the questions in each assigned chapter at our Top Hat website. You will have two tries at each question. **Important: Never waste a wrong answer!** If your first answer to a question is wrong, look for the answer in the reading before you try again.

Reading assignments **are due every Thursday night**. Try to finish assignments early because:

- It is best to read each chapter before it is covered in lecture so that you can look for things in the lecture that you had trouble understanding in the chapter.
- Sometimes two chapters will be due at once and the night before they are due might not be enough time to read them both and answer all of the questions.
- Technology like your computer and its internet connection can be counted on to go bad at the worst possible time --- like all day Thursday for example.

Your homework score for the semester will be the average of all your reading homework scores, starting with the Chapter 3 homework, with the lowest score dropped.

<b>Homework Schedule</b>		
Chapters	Assigned 7:30am	Due 11:59pm
1,2	22-Jan	28-Jan
3,4	29-Jan	4-Feb
5	2-Feb	11-Feb
6,7	12-Feb	18-Feb
8	19-Feb	25-Feb
9	26-Feb	4-Mar
10	5-Mar	11-Mar
11	12-Mar	18-Mar
12	19-Mar	25-Mar
13	26-Mar	1-Apr
14	2-Apr	8-Apr
15	9-Apr	15-Apr
16	16-Apr	22-Apr
17,18	23-Apr	29-Apr

## Packback Posting

Each week you get a “posting score” from the Packback Discussion Forum. The posting score is 100% if you asked at least one question with a curiosity score of over 30 and gave at least two responses with scores of over 30%. The curiosity scoring is done by a program that looks for complex, open-ended questions and well-referenced answers.

Packback posts are **due every Saturday night at 11:59**. Posts made after that time go toward the following week. Try to get your posts done early in the week so that you can respond if Packback rejects one. Also, if your internet connection does not go down on Thursday, you can bet that it will be down on Saturday night.

Your posting score for the semester will be the average of your weekly posting scores, starting with Week 2 (Jan 30 to Feb 6) with the lowest score dropped.

## Engagement

**Weekly Engagement Points:** Each Sunday your Blackboard gradebook will provide a list of scores:

- The total of all your Packback curiosity scores for the preceding week.
- The lecture response score for each of the lectures (/100) for the preceding week.

Add up these scores to get your **Engagement Total** for the week.

**Target Total:** Your goal is to get all of the responses correct and get a total Packback Curiosity Score of 150 points each week. For a normal week with three lectures and one quiz, that adds up to a target of 350 engagement points. If some lectures are missed due to holidays, exams, weather, etc., the target will be lower.

**Weekly Engagement Score:** This score is the percentage of the target total that you achieved. If you post extra questions and responses with decent curiosity scores, you can easily get this score to **go over 100%**. Scores above 150% are set back to 150%, so you can get some **extra credit** from posting, but you have to spread it out over the semester.

**Overall Engagement Score:** Your overall Engagement score for the semester is the average of all your weekly engagement scores, starting with Week 2 (Feb 1-6) and dropping the lowest score.

## Assessment

**There will be Four open-book, online progress exams.** Each exam consists of 50 multiple choice questions assigned as Top Hat “homework.”

- **Exam 1:** Chapters 1-4; from 7:30am to 11:59 on February 10, 2021
- **Exam 2:** Chapters 5-8; from 7:30am to 11:59 on March 10, 2021
- **Exam 3:** Chapters 9-12; from 7:30am to 11:59 on April 7, 2021
- **Exam 4:** Chapters 13-16; from 7:30am to 11:59 on April 28, 2021

**A required, comprehensive open-book, online final exam** will consist of 120 multiple-choice questions, with at least one question from each section of the lecture notes.

from 7:30am May 6, 2021 to 11:59pm May 7, 2021

**Total Assessment Score:** Each exam has a maximum score of 100. Compute your Total Assessment Score as follows:

Add up all five scores (4 progress exams and the final).

Subtract the lowest of the five scores.

Add twice the final exam score.

Divide by 6.

The first two steps cause the final exam to **replace** your lowest hour exam score when the final exam score is not the lowest. The third step means that the final exam is at least 1/3 of your assessment score whether it replaces anything or not.

**Notice that the final exam score itself is never replaced.**

**Notice that the grading procedure does not change or replace any of the exam grades given in the Blackboard Student Gradebook.**

**Notice that this scheme is NOT the same as DROPPING the lowest progress exam. Missing a progress exam puts more weight on the comprehensive final exam, which is not something you should want.**

## Final Grade Calculation

Your final score is

10% Homework + 10% Posting + 15% Engagement + 65% Assessment + Extra Credit

This score determines your grade:

A=90.0-100.0, B=80.0-89.9, C=69.5-79.9, D=59.5-69.4

### Extra Credit

1% extra credit may be earned by taking the online Science Literacy Assessment exam as a pre-test at the start of the semester and as a post-test at the end of the semester. These tests are available on the assignments page of your Top Hat account.

Up to 7.5% extra credit may be earned by **consistently** posting extra questions and responses on Packback. The engagement score for each week is allowed to go over 100% **but scores over 150% are set back to 150%**. To take full advantage of this extra credit, you need to spread it out over the whole semester.

Up to 5% extra credit may be earned by completing the **Moon Observation Project**.

- Preview deadline: February 26, 2021 at 11:59pm
- Project deadline: April 19, 2021 at 11:59pm.

See the project instructions on Blackboard for details. **Important: Do not report Moon observations when the Moon was not actually in the sky.** Project reports doing that will receive very little credit.

### Makeup Policy

**Exams: Makeup hour exams will not usually be given after the regular exam time.** If you know that you cannot make a scheduled exam, you may schedule a time to take the exam **early**. If you miss an hour exam due to an unexpected event such as illness, accident, family crisis or other problem, the grading procedure will have the effect of replacing the missed exam with the final exam score. **If you miss the final exam, you may make it up only if you submit a request for a grade of incomplete.**

<https://rar.vcu.edu/media/strategic-enrollment-management/rar/docs/IncompleteGrade1.pdf>

**Lecture Top Hat Questions:** Sometimes you forget to do the lecture on the day it is due. Sometimes your cell phone and your computer both die and you cannot respond to any questions. Get the lost engagement points back by asking and answering more questions in the Packback Curiosity Community during that same week. Usually, two extra Packback posts will more than make up for missing a lecture.

**Packback Problems:** Suppose your computer dies and takes a week to fix or you get too sick to use the computer. You can get those points back by over-achieving in later weeks, posting more really good questions and answers than are required.

## Tentative Schedule of Topics

**Here is the plan.** We will probably stay close to it, but sometimes stuff happens, so you should not use this plan to determine the times and content of the exams. Similarly, do not look here to determine what modules we have covered on any given day during the semester. Instead, look at the list of questions asked in class that is given in the Top Hat Gradebook.

Week	Dates	Chapters	Topics
1	Jan 25-29	1-2	Syllabus, Observations, Models, Constellations
2	Feb 1-5	3-4	Planets, Science, Moon Phases
3	Feb 8-12	4-5	Model of Motion, <b>Exam 1</b> , Newton's Laws of Motion
4	Feb 15-19	5-6	Physics, Gravity, Solar System Overview
5	Feb 22-26	7	Terrestrial Planets
6	Mar 1-5	8-9	Earth's Moon, Jovian Planets
7	Mar 8-12	9	Jovian Planets, <b>Exam 2</b> , Outer Solar System
8	Mar 15-19	10	Pluto and Beyond, Solar System Formation
9	Mar 22, 26	11	Living Earth, Earth Impacts
10	Mar 29/-2	12	The Search for Life
11	Apr 5,9	13	Telescopes, <b>Exam 3</b> , Light, Parallax, Doppler Effect
12	Apr 12-16	13-14	Measuring Star Distances, Hertzsprung Russell Diagram
13	Apr 19-23	15-17	The Births and Death of Stars, Black Holes, Milky Way
14	Apr 26, 30	17-18	Dark Matter, <b>Exam 4</b> , Galaxies
15	Apr 3, 5	18	The Expanding Universe,

Engagement scores begin to count for Week 2. However, engagement activities --- Top Hat in-class questions and quizzes and the Packback Curiosity Community --- begin on the first day of class to allow time for you to get accustomed to the system and resolve problems.

### General VCU Syllabus Information

Visit <http://go.vcu.edu/syllabus> and review all syllabus information. The full university syllabus statement includes information on safety, registration, the VCU Honor Code, student conduct, withdrawal, and more.