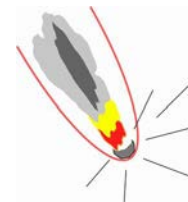


PHYS 103-001 Elementary Astronomy
Syllabus
Spring 2022

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.



Learning Outcomes: 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

Office hours by appointment

Class Schedule: MWF 11am – 11:50am

Room: MCALC 1107.

Required Item: Top Hat Subscription – FREE for VCU students

Required Item: Packback Questions Subscription (\$29 for the semester)

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

Last Day to Drop: January 24, 2021

Last Day to Withdraw with a W: March 25, 2022.

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 *before* we cover it in class. 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**.”

After each main point in lecture, I will ask a question about it and you will discuss the question with classmates and respond using the Top Hat system. Each response gets half credit for the response and half credit for correctness. The percentage of possible credit becomes your “**Top Hat response score**” for that lecture.

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 70 curiosity points) about anything related to science and at least **two substantial responses** (more than 70 curiosity points) each week to obtain a 100% **posting score** for the week. In addition, the average curiosity score of all your posts during the week becomes your **curiosity score** for the week.

The lectures cover a great deal of detailed information that you are expected to retain. Online, open-book Multiple-choice exams will assess how much you retain. There will be four progress exams and a final exam.

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

Overall score

$$\begin{aligned} &= 15\% \text{ Homework} + 10\% \text{ response scores} + 15\% \text{ Posting} + 40\% \text{ Progress Exams} \\ &\quad + 20\% \text{ Final Exam} + \text{extra credit} \end{aligned}$$

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

Note: Weekly posts in the Packback Questions Discussion Forum are **required** and impact 15% of your overall grade.

Tip: Do a brief internet search before each question or answer that you post. That will let you give a thorough explanation of your post with some sources to cite and will increase your “curiosity” scores.

Websites

Canvas Website: Our course has a website on Canvas. There, you will find all of your assignments with due dates and all of your grades. The grades include your current letter grade in the course, calculated according to the method given in this syllabus. The Canvas assignments include direct links to the Top Hat and Packback assignments. Eventually you should be able to work entirely from Canvas, but that “deep linking” is a work in progress, so you may have to navigate to your assignments on Top Hat and Packback.

Top Hat: We will be using the Top Hat (www.tophat.com) classroom response system in class. 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. You should already have a free Top Hat account set up for this class and will just need to activate it.

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/225970>.

- Note: our Course Join Code is 225970.
- VCU will require you to use your VCU eID to register.
- Top Hat is free for all VCU students.
- 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), the in-app support button, ‘?’, or by calling 1-888-663-5491.

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.

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. Please refrain from questions about religion or politics.

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 will receive an email inviting you to revise it.

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

Note: If you edit and resubmit a rejected post after the weekly deadline, you will receive credit in the week that you submitted your original post.

You will receive a welcome email from holla@packback.co prompting you to finish registration and payment. Packback has already created an account for you with your school email, *all you need to do is reset your password*. This email may be directed to spam or filtered out, so make sure you do a thorough scan of your inbox if you can't find the email.

If you search your inbox and still can't find the welcome email, or if you are new to the course, you may manually register by following the instructions below:

1. Navigate to <https://Packback.co/questions> and click "Register as a new student".
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: f224978a-7c89-44e2-9e3f-7911a1537a0e**
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!

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

Homework

Reading assignments will be given on the Assignments page of our Canvas 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.

Packback Posting

Each week you get a "Posting Score." The posting score is 100% if you asked at least one question with a curiosity score of over 70 and gave at least two responses with scores of over 70. 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 submitted after that time go toward the following week. If Packback rejects a post, they will email you and give you a chance to edit and resubmit it. If you resubmit after the deadline for the week, you will receive credit in the week that you submitted.

Your posting score for the semester will be the average of your weekly posting scores, starting with Week 2 (Jan 30 to Feb 6). Because the scores are combined and sent to me each week by Packback, I cannot move posts from one week to another. If you miss a week of posting, you cannot make it up later. However, I will drop some of your lowest posting scores.

Exams

There will be four progress-exams. The exams are online and open-book. Each exam consists of 50 multiple choice questions assigned as Top Hat “homework” 7am on one day to 11:59pm on the next. Consult the “Assignments” page of Canvas for the dates and the material that each exam covers. Each exam can be completed in less than an hour. You do not need to do the exam at one sitting, but can go in and out of it as you have time.

Calculate the **Overall Progress Exam Score** by replacing the lowest progress exam score by the final exam score unless the final exam is even lower. In Canvas, this is done by including a copy of the final exam score in the progress exam group and dropping the lowest score from that group.

A comprehensive final exam will consist of 120 multiple-choice questions, with at least one question from each section of the lecture notes. The exam can be completed in less than two hours. You do not need to do the exam at one sitting, but can go in and out of it as you have time.

Final Exam: Available from 7am Wednesday, May 11, 2022 to 11:59pm May 12

You must take the final exam.

Note: You may ask to take an alternate online version of the final exam before the scheduled time.

The final exam counts as 20% of your grade. In Canvas, the final exam appear in its own “Final Exam” group, worth 20% as well as in the “Progress Exam” group where it can replace a low score.

Final Grade Calculation

Your final score is

15% Homework + 10% response scores + 15% Posting + 40% Progress Exams

+ 20% Final Exam + 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 will be available at our Top Hat web site and are announced through your VCU email. You need to take both tests to get the credit.

Note: Canvas does not have a separate provision for extra credit assignments, so the Science Literacy Assessment Exam will appear as a zero credit assignment in the Lecture Responses group. The actual credit for doing both assessments will be chosen so as to add 10 percentage points to your lecture response grade.

Makeup Policy

Exams: Makeup progress 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 an alternate version of the exam **early**. If you miss a progress 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/rar/forms/IncompleteGrade1.pdf>

The form will be used to submit a grade of 'I' in the event that you do not complete a makeup before I submit grades. Otherwise, I will submit the grade that you have earned.

In-class Top Hat Questions: Sometimes you get sick and can't come to class. Sometimes you arrive late or have to leave early and do not answer all of the questions or arrive after the questions have started. Sometimes your cell phone dies and you cannot respond to any questions. Let me know about the problem so that I can consider excusing you for the affected questions.

Packback Problems: Suppose your computer dies and takes a week to fix or you get too sick to use the computer. Send me proof of the problem so that I can excuse you for that week.

Dropped Scores: I will drop at least the two lowest scores of each type for lectures, posting, and homework.

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. The exam schedule on the “Announcements” page of our Blackboard website will be kept up to date and is the place to look for that information. 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
0	Jan 19-21	1	Syllabus, Observations, Scientific Models
1	Jan 24-28	2,3,4	Constellations, Seasons, Planets, Philosophy of Science
2	Jan 31/-4	4,5	Moon Phases, Models of Motion, Exam 1
3	Feb 7-11	5,6	Newton’s Laws, Gravity, Solar System Overview
4	Feb 14-18	6,7	Physics, Gravity, Solar System Overview
5	Feb 21-25	7,8	Terrestrial Planets, Earth’s Moon
6	Feb 28/-4	9	Jovian Planets, Exam 2 ,
7	Mar 14-18	9,10	Pluto and Beyond, Solar System Formation
8	Mar 21-25	11	Living Earth, Earth Impacts
9	Mar 28/-1	12	The Search for Life
10	Apr 4-8	13	Telescopes, Exam 3 , Light, Parallax, Doppler Effect
11	Apr 11-15	13,14	Measuring Star Distances, Hertzsprung Russell Diagram
12	Apr 18-22	15-17	The Births and Death of Stars, Black Holes
13	Apr 25-29	17,18	Milky Way. Dark Matter, Exam 4 , Galaxies
14	May 2	18	The Expanding Universe,

General VCU Syllabus Information

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