NEW ENGLAND BIBLE COLLEGE AND SEMINARY

Introductory Astronomy: Exploring God's Universe

Syllabus

GE-As 101 Introductory Astronomy

Course Overview

Course Description

A descriptive course about the solar system, stars and stellar evolution, galaxies, and the universe. Recent findings of space exploration and radio astronomy are included. With a unique integration of science and Scripture, you will explore how modern discoveries affirm the beauty, order, and complexity of God's creation.

Credit Hours: 4hrs

Prerequisite: College Algebra or equivalent skills

Learning Outcomes

By the end of this course, you will be able to:

- Explain major astronomical concepts like celestial mechanics, planetary science, and cosmology.
- Analyze historical and modern perspectives on the universe through a scientific and biblical lens.
- Develop observational skills to study the night sky using various tools and mathematical models. Explain the connection between stellar spectra and the atomic composition of stars.
- Investigate the physics of stellar fusion energy production and nucleosynthesis, including stellar life cycles, from formation to black holes.
- Evaluate cosmological models and the fine-tuning argument for the universe's design.
- Integrate faith and science by exploring how biblical principles align with astronomical discoveries.

Resources

1. *Astronomy 2nd Edition, Fraknoi, Morrison, Wolff*.
2. Lab Kit
3. Note: The High-Altitude Balloon (HAB) Labs are done in conjunction with Near Space Education, who are graciously providing their services. Enrollment in the course assumes that you give permission for them to publish the results of your HAB experiment.

Required Technology

This course requires the use of the Stellarium app for several assignments and activities. Students must have access to a smartphone, tablet, or another compatible device capable of installing and running the Stellarium app. Please ensure your device meets the app's minimum requirements.

Optional

1. Recommended: Dinah L. Moché, Astronomy: A Self-Teaching Guide, 8th ed. (Trade Paper, 2014).
2. Recommended: Eric Hedin, Canceling Science: What Some Atheists Don't Want You to See (Discovery Institute, 2021).

Great Astronomy websites

- Astronomy Picture of the Day: Discover the cosmos! (shows a different image or photograph each day of our fascinating universe is featured, along with a brief explanation written by a professional astronomer)
- Hubble Space Telescope Images

Course Outline

Module Zero: Getting Started

Title	Type	Duration	Points
Course Intro/About the Course Author	Input	.5 hrs	--
Announcements and Student Questions	Annoucements	.25 hrs	--
Syllabus	File	1 hr	--
Course Materials	Ebook	Varies	--
Lab Manual	PDF	Varies	--
Totals		**2+ hrs**	**0**

Module One: The Grand Design of the Universe

Title	Type	Duration	Points
Watch and Read	Input	4 hrs	--
How Does It Work?	Discussion	3 hrs	25
Live Session	Discussion	1 hr	10
Module 1 Quiz	Quiz	1 hr	25
Observation Journal 1	Journal	1 hrs	15
Lab 1: Measuring Things	Lab	3 hrs	25
Lab 2: Scientific Notation and Unit Conversion	Lab	3 hrs	25
Lab 3 (Extra Credit): Parallax and Retrograde Motion: Measuring Distance and Planetary Motion	Lab	3 hrs	up to 10
Prep for HAB Lab	Preparation	2 hrs	--
Course Survey	Feedback	.5 hrs	--
Totals		**18.5 hrs**	**125**

Module 2: Earth, Moon, and Celestial Motions

Title	Type	Duration	Points
Watch and Read	Input	4 hrs	--

Title	Type	Duration	Points
God’s Order, Great and Small	Discussion	3 hrs	25
Live Session	Discussion	1 hr	10
Module 2 Quiz	Quiz	1 hr	25
Preparation for Observation Journal	Preparation	2 hrs	--
Lab 4: Kepler’s 3 Laws (Planetary Orbits)	Lab	3 hrs	25
Lab 5 (Extra Credit): Galilean Moons	Lab	2 hrs	up to 10
HAB Lab 1: Developing a Stratospheric Experiment	Lab	5 hrs	40
Totals		**19 hrs**	**125**

Module 3: The Solar System

Title	Type	Duration	Points
Watch and Read	Input	4 hrs	--
Conditions for Life	Discussion	3 hrs	25
Live Session	Discussion	1 hr	10
Module 3 Quiz	Quiz	1 hr	25
Preparation for Observation Journal	Preparation	2 hrs	--
Lab 6: Building Our Solar System	Lab	2 hrs	25
Lab 7 (Extra Credit): The Age of Planetary Surfaces	Lab	2 hrs	up to 10
HAB Lab 2: Balloon Launch, Flight Operations and Recovery	Lab	5 hrs	40
Totals		**19 hrs**	**125**

Module 4: Stars and Their Life Cycles

Title	Type	Duration	Points
Watch and Read	Input	4 hrs	--
Fine Tuning in Stars/Interstellar Travel	Discussion	3 hrs	25
Live Session	Discussion	1 hr	10
Module 4 Quiz	Quiz	1 hr	25
Observation Discussion	Discussion	1 hr	5
Observation Journal 2	Journal	1 hr	10
Lab 8: Exploring Light and Spectra	Lab	4 hrs	25

Title	Type	Duration	Points
Lab 9 (Extra Credit): The H-R Diagram	Lab	3 hrs	up to 10
Lab 10: Tracking Sunspots and Solar Rotation	Lab	4 hrs	25
Course Survey	Feedback	.5 hrs	--
Totals		**19.5 hrs**	**125**

Module 5: Astronomy and Faith

Title	Type	Duration	Points
Watch and Read	Input	4 hrs	--
Faith and Astronomy Research	Discussion	4 hrs	25
Live Session	Discussion	1 hr	10
Module 5 Quiz	Quiz	1 hr	25
Observation Journal 3	Journal	1 hr	15
Genesis 1 and Astronomy	Submission	7 hrs	50
Totals		**18 hrs**	**125**

Module 6: Star Death, Spacetime, and Black Holes

Title	Type	Duration	Points
Watch and Read	Input	4 hrs	--
Star Life Cycles	Discussion	3 hrs	25
Live Session	Discussion	1 hr	10
Module 6 Quiz	Quiz	1 hr	25
Observation Journal 4	Journal	2 hrs	15
Lab 11: How long do stars live?	Lab	4 hrs	25
Lab 12 (Extra Credit): Supernovae	Lab	4 hrs	up to 10
Lab 13: Compact Stellar Objects	Lab	4 hrs	25
Totals		**18 hrs**	**125**

Module 7: Galaxies and the Universe

Title	Type	Duration	Points
Watch and Read	Input	4 hrs	--
Our Sun’s Place	Discussion	3 hrs	25

Title	Type	Duration	Points
Live Session	Discussion	1 hr	10
Module 7 Quiz	Quiz	1 hr	25
Observation Journal 5	Journal	1 hr	15
Lab 14: Galaxy Quest	Lab	4 hrs	25
Lab 15 (Extra Credit): A Mini Hubble-Lemaître Survey	Lab	4 hrs	up to 10
Lab 16: Weighing a Galaxy Cluster	Lab	4 hrs	25
Totals		**18 hrs**	**125**

Module 8: Cosmology and the Origin of the Universe

Title	Type	Duration	Points
Watch and Read	Input	4 hrs	--
The “Big Bang”	Discussion	3 hrs	25
Live Session	Discussion	1 hr	10
Module 8 Quiz	Quiz	1 hr	25
Lab 17: Balloon Universe	Lab	3 hrs	25
Lab 18 (Extra Credit): The Drake Equation	Lab	2 hrs	up to 10
HAB Lab 3: Experiment Analysis and Sharing Results	Lab	5 hrs	40
Course Survey	Feedback	.5 hrs	--
Totals		**17.5 hrs**	**125**

Live Sessions

This course has live meetups for Q and A, typically one hour every module. If you cannot attend, you can recoup the points for the session by watching the recording and submitting a 300-word summary/response. Since these sessions will be audio-visually recorded, those who participate with their camera engaged are agreeing to have their video, image, or voice recorded.

Point Distribution

- Discussions: 200
- Live QandA Sessions: 80
- Quizzes: 200
- Observation Jounral: 75
- Labs: 370
- HAB Labs: 75

Each student will earn a grade that is reflective of what they have achieved in this course. Learning is paramount to the educational process. If learning is to take place, there is no alternative but to work. There are no shortcuts. Each student will receive a grade for this course that is determined by the total number of points earned. Since grades are based upon what a student earns, it is possible for each student to receive an “A” letter grade.

Policy/Procedures

ACADEMIC DISHONESTY STATEMENT

Campus courses maintain a strict policy concerning academic dishonesty, which includes cheating, plagiarism, assisting on an examination or paper when expressly forbidden by the instructor, and any other practices that demonstrate a lack of academic integrity. Cheating occurs whenever a student uses deception to avoid fulfilling the specific requirements of an assignment or course and/or to receive a higher grade than they might otherwise receive. Using artificial intelligence software (such as ChatGPT) to generate writing and pass it off as one's own is also considered cheating. Plagiarism occurs when a student appropriates passages or ideas from someone else's writing into their own without providing proper documentation and/or without using quotation marks to indicate when they are directly quoting a source. It is the student's responsibility to know and adhere to principles of academic honesty. A student found guilty of academic dishonesty will be subject to academic sanctions ranging from failure on the assignment to failure in the course to, in cases of repeated or flagrant violation, suspension, or dismissal from participation in Campus courses. There may also be repercussions with the university transcribing your credit. Consult the Student Handbook of that college or university.

COURSE GRADING SCALE

- 95-100 A (Excellent)
- 92-94 A-
- 89-91 B+
- 85-88 B (Good)
- 82-84 B-
- 79-81 C+
- 75-78 C (Satisfactory)
- 72-74 C-
- 69-71 D+
- 65-68 D (Passing)
- 62-64 D-
- Below 62 F (Below Min. Standards)

DROP PERIOD AND WITHDRAWAL

The Drop period for Campus courses is five days after the student has enrolled and their designated term has begun. No refund will be available after this point.

Although many Campus classes are technically self-paced, students will be provided with a pacing guide (when relevant) to assist them in knowing how best to complete their courses on time. Failure to log in during the first week after their course commences will result in automatic removal from the course.

If a student is significantly behind pace two-thirds of the way through their term, they are encouraged to withdraw from the course with a W or equivalent appearing on their transcript. Beyond that point, they will no longer be eligible for a W on their transcript and thus are in danger of receiving a failing grade. Campus will report persistent failure to participate to the transcribing college or university. After the two-thirds point, a student will receive a letter grade for the course, including the possibility of a failing grade.

INCOMPLETE GRADE

A temporary neutral mark "I" is given at the discretion of an instructor when, for a legitimate reason, a student cannot complete course requirements in a given semester. Apart from catastrophic circumstances, a student is not eligible for an incomplete if they have not completed at least 60% of their coursework for the semester. Typical instances might be an extended illness or an inability to complete the coursework because of extenuating circumstances. A contract between the instructor and the student will accompany this grade to indicate the nature of the work to be completed. An Incomplete Grade (I) should not be used as an alternative to a grade of F. An Incomplete Grade must be made up before the seventh week of the next term whether or not the student is subsequently enrolled with Campus or the university. If the grade is not made up by the deadline, it will be changed to the appropriate grade earned in the course at that point.

DISABILITY STATEMENT

Campus-affiliated institutions comply with Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990. Students with disabilities who need accommodations must self-identify and submit acceptable documentation to the Office of Disability Services.

Additional information is available from the transcribing college or university.

LIBRARY RESOURCES

Library information for the transcribing college or university will be made available.

CREDIT HOUR POLICY - EXPECTATION OF WORK

In compliance with federal regulations (34CFR 600.2), Campus requires its courses to require a total workload of at least 2250 minutes per credit hour for the typical student. This workload may be comprised of time allocated to direct faculty-student interaction, assigned readings, independent or group assignments, expected study time, or other course-related activities as appropriate to the specific course and determined by the faculty of record.

GRADE APPEALS

In the case of a grade appeal, the student shall be considered to have an authentic grievance when he/she can demonstrate his/her grade for a course has been adversely affected due to certain actions by a faculty member. A grade appeal shall be initiated within ten (10) working days after receipt of the grade or after the beginning of the next academic semester. This period may be extended by the chief academic officer of the transcribing college or university on petition from the student(s) involved. More information concerning this policy and the steps for resolution may be found in the Student Handbook of the transcribing college or university.

CAMPUS EDU PRIVACY POLICY

https://www.campusedu.com/privacy-policy