The history of astronomy is a history of receding horizons.

Edwin Hubble (1889-1953)

ASTRONOMY 1660 – History of Astronomy
SYLLABUS – Fall 2021

Professor Information:

Name: JP Caillault
Office: 237 Physics
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Office Hours: TuTh 2:00 – 3:00 or by appointment

Course Information:

Description: This course will introduce non-science major students to essential ideas, predictions, and discoveries in the History of Astronomy, ranging from those of the ancient Greeks (such as determining the size of the Earth and the distance to the Sun) to the modern day revolutionary concepts of Dark Matter and Dark Energy. We'll run into some of the greatest scientists in history: Kepler, Galileo, Newton, Einstein, Hubble, Zwicky, and Chandrasekhar. And we'll encounter truly bizarre astronomical objects, like white dwarfs, pulsars, and black holes, and concepts, like relativity, the Big Bang, and gravitational waves.

The primary goals of the course are to have students understand and appreciate the details of these astronomical topics and to enable students to be able to converse intelligently about astronomy-related items in the news.

There are no prerequisites for this course, but some algebra may be used occasionally to help explain some concepts. This course fulfills the UGA General Education Core Curriculum Physical Science requirement.

Required book: *Archives of the Universe*, by Marcia Bartusiak. This book isn't a textbook, per se, but we will follow the general outline of the book throughout the course. Please note that there are topics mentioned in the book that we will not cover in class and there are topics we will cover in class that are not mentioned in the book, so class attendance is essential.

Exams: There will be four in-class exams, each worth 20 points toward your grade. There will also be a final exam, equivalent to each of the first four exams. Each exam will cover five lectures.

Make-Up Exams: If you must miss an exam for a serious, documentable reason, then you must notify me in advance either in person or via e-mail. You must also provide the documentation for your absence within one week of the date of the missed exam. If you have done both of those things, then you may take a make-up exam for that section of the course during the time-slot for the Final Exam (Tuesday, December 14, 12 noon), after you have taken the Final Exam. If you have not notified me in advance or you have not provided documentation of your reason for missing the exam, then your score for that missed exam will be zero.

Grades: The final course letter grade will be determined by your five exam scores ($5 \times 20 = 100$ points) and according to the scale shown below. Please note that there is no extra credit available and there are no A's for effort.

$$
\begin{array}{c}
93 \le \text{A} \\
90 \le \text{A}- < 93 \\
87 \le \text{B}+ < 90 \\
83 \le \text{B} < 87 \\
80 \le \text{B}- < 83 \\
77 \le \text{C}+ < 80 \\
73 \le \text{C} < 77 \\
70 \le \text{C}- < 73 \\
60 \le \text{D} < 70 \\
\text{F} < 60
\end{array}
$$

Academic Honesty: The University's Academic Honesty Policy (A Culture of Honesty) is strictly adhered to. Make sure you know and understand the policy.

Classroom Policies: We want a harmonious and cooperative learning atmosphere in the classroom, so please refrain from behavior that is disturbing to other students. In particular, cellphones, iPads, and iPods need to be turned off or silenced. You may use laptops for taking notes, but texting, checking email, Facebook, etc. can be distracting to you and those sitting behind you. Other examples of disruptive behaviors include arriving late to class or leaving early; packing up books before class is over; dozing in class; noisy eating or drinking; and conducting side conversations. All of these behaviors distract other students and make it difficult for them to maintain their concentration.

Tentative Class Schedule:

Date (Day)	Topic (Chapters in *Archives of the Universe*)
Aug. 19 (R)	Introduction to ASTR 1660
Aug. 24 (T)	Ancient Greeks: Aristotle, Aristarchus, Eratosthenes (2, 3, & 4)
Aug. 26 (R)	Geocentric (Ptolemy) vs Heliocentric (Copernicus) (6 & 7)
Aug. 31 (T)	Tycho and his apprentice, Kepler (8 & 9)
Sept. 2 (R)	Galileo's great telescopic discoveries (10)
Sept. 7 (T)	Newton's Laws of Motion and Gravity (11, 12, & 20)
Sept. 9 (R)	**Exam 1**
Sept. 14 (T)	Speed of light (14) and Parallax (19)
Sept. 16 (R)	The Shape of the Milky Way and Spiral Nebulae (21 & 22)
Sept. 21 (T)	Spectral lines, Doppler shifts, and Binaries (23, 24, & 26)
Sept. 23 (R)	Stellar classification & Giants and Dwarfs (27 & 28)
Sept. 28 (T)	Hydrogen and Helium (29 & 31)
Sept. 30 (R)	**Exam 2**
Oct. 5 (T)	Einstein's Special Relativity and $E = mc^2$ (35)
Oct. 7 (R)	Einstein's General Relativity and the Solar Eclipse Test (36)
Oct. 12 (T)	Cepheids & the Sun's Place in the MW (48 & 49)
Oct. 14 (R)	Hubble: M31 & the Expansion of the Universe (51 & 52)
Oct. 19 (T)	Creation of the Elements – Stellar Nucleosynthesis (43 & 46)
Oct. 21 (R)	**Exam 3**
Oct. 26 (T)	White Dwarf Stars and the Chandrasekhar Limit (39 & 40)
Oct. 28 (R)	Supernovae and Neutron Stars (41)
Nov. 2 (T)	Black Holes (42)
Nov. 4 (R)	Pulsars, Binary Pulsars, & Gravitational Waves (64 & 68)
Nov. 9 (T)	LIGO (online sources)
Nov. 11 (R)	**Exam 4**
Nov. 16 (T)	Dark Matter & Gravitational Lensing (69 & 70)
Nov. 18 (R)	Big Bang (37, 38, 44, 45, & 63)
Nov. 23 (T)	Inflation (71)
Nov. 30 (T)	Dark Energy and the Accelerating Expansion (75)
Dec. 2 (R)	Extrasolar Planets (74 and online sources)
Dec. 14 (T)	**Final Exam (12 noon)**