

# HISTORY OF ASTRONOMY THROUGH NEWTON

AST3043, SECTION 215G, 11738, 3 CREDITS, FALL 2022

**INSTRUCTOR:** *Naibi Mariñas*

*E-mail address: [marinas@ufl.edu](mailto:marinas@ufl.edu) (use Canvas Inbox for communication outside class time)*

**MEETING TIMES:** *MWF, 4<sup>th</sup> Period (10:40 to 11:30 am)*

**CLASSROOM:** *FLG 280*

**OFFICE HOURS:** *Wednesdays 11:30 – 12:30 pm or by appointment*

**COURSE WEBSITE:** *<https://ufl.instructure.com/>*

**COURSE COMMUNICATIONS:** *For any class-related logistic or content questions outside class time, students should use **Course Questions** discussion board. This will benefit all students that might have similar questions and avoid repetitive questions. The instructor will regularly answer all questions posted in the board. **If a student has a private question, the student should contact the instructor using the Inbox in Canvas instead.***

*Students can expect a reply from the instructor within 24 hours during weekdays in the Course Questions discussion board, unless the question is posted during the two final weeks of classes. If a post is made Friday afternoon or during the weekend, it will not be answered until Monday.*

*The instructor will use the **Announcements** in the class website to communicate with the whole class outside class time. Students should frequently check the Announcement page. The class settings can be adjusted so that announcements are sent directly to emails.*

**PREREQUISITE KNOWLEDGE AND SKILLS:** There are no higher education prerequisites or co-requisites for this course. However, a high school level knowledge of geometry and trigonometry is needed.

**RECOMMENDED TEXT:** *Michael Hoskin, [The Cambridge Concise History of Astronomy](#) (Cambridge University Press, 1999).* We will follow this textbook in class. Additional material will be provided by the instructor.

**COURSE DESCRIPTION:** This course covers the history of astronomy from prehistoric times through Newton, placing each work in the context of their cultural environment. Emphasis is placed on the works of Ptolemy, Copernicus, Kepler, Galileo and Newton.

The course is organized into seven sections:

1. Basics of naked-eye astronomy. Celestial sphere. Understanding celestial motion.
2. Archeoastronomy around the world. Megalithic culture of Northern Europe. Pre-Columbian astronomy in America.
3. Astronomy in antiquity. Egyptians, Babylonians and the early Greeks.
4. Islamic astronomy. Great observatories of Islamic period.
5. Medieval Latin Astronomy. Copernicus
6. From geometry to physics: Tycho, Kepler, Galileo and Descartes
7. Isaac Newton and the triumph of science

### GRADING POLICIES:

See <https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx> for general UF grading policies. Grades for the course will be based on the following:

| Assignment                     | Points or percentage |
|--------------------------------|----------------------|
| Online Graded Quizzes          | 10 %                 |
| Participation/Class Activities | 10 %                 |
| Project                        | 40 %                 |
| In-class Exams (3 exams)       | 40 %                 |

### GRADING SCALE:

| Grade | % Points | GPA  | Grade | % Points | GPA  | Grade | % Points | GPA  |
|-------|----------|------|-------|----------|------|-------|----------|------|
| A     | > 90     | 4.0  | B-    | 77 – 79  | 2.67 | D+    | 64 – 66  | 1.33 |
| A-    | 87 – 89  | 3.67 | C+    | 74 – 76  | 2.33 | D     | 60 – 63  | 1.0  |
| B+    | 84 – 86  | 3.33 | C     | 70 – 73  | 2.0  | D-    | 57 – 59  | 0.67 |
| B     | 80 – 83  | 3.0  | C-    | 67 – 69  | 1.67 | F     | < 56     | 0    |

**QUIZZES (10 %):** A major responsibility for this class will be to complete the online quizzes given in the class website to help you keep up with the class and learn the material.

**PARTICIPATION/CLASS ACTIVITIES (10 %):** Attendance and participation is required. Experiential activities will be assigned during class to deepen your understanding of the course content and reflect on the material presented in class.

**PROJECT (40 %):** Astronomical instruments were an essential part of astronomy even before the invention of the telescope. Students in this class will work in the construction of an ancient astronomical instrument. The instrument needs to be functional and will be used to collect data. The instructor must approve all projects. All students will create and present their instrument and the data collected to the class at the end of the semester. Your final presentations will be evaluated by your peers and instructor. More information on this project will be provided in class.

**EXAMS (40 %):** There are three one-hour exams in the course, scheduled during class time on the dates listed in the class website. The in-class exams in this course will consist of approximately 40 multiple-choice questions. The exams will be formally non-cumulative; however, since this is a science course there will inevitably be references to things we've covered before on the second and third tests. I will post topics to study in the class website before each exam. All exams will be proctored. The exams are closed notes, closed book and no help is allowed during the exams.

**LATE ASSIGNMENT POLICY:** Students may submit individual assigned work after the stated deadline. A 10% grade penalty is assessed for work up to twenty-four hours late; an additional 10% is assessed for **each** additional day the work is late.

**MAKE-UP POLICY:** If a student misses an assignment due to an excused absence as specified in the undergraduate catalog and provides the instructor with timely notification, they will be allowed a reasonable time to make up the missed work. *The format of a make-up test/exam will be at the discretion of the instructor; these exams will not be exclusively multiple-choice questions.*

## GENERAL EDUCATION REQUIREMENTS:

AST 3043 has been designated a General Education course that can be counted towards either the Physical Science (P) or Humanities (H) requirements (but not both). In addition, it can be counted towards the International (N) requirement. A minimum grade of "C" is required for general education credit.

**PHYSICAL SCIENCE:** The physical and biological sciences provide instruction in the basic concepts, theories, and terms of science and the scientific method. Courses focus on major scientific developments and their impacts on society and the environment. You will formulate empirically-testable hypotheses derived from the study of physical processes and living things and you will apply logical reasoning skills through scientific criticism and argument.

**STUDENT LEARNING OUTCOMES** for a GenEd physical science course in astronomy are as follows:

#### I. Content

1. Know the basic concepts, theories, and terminology of natural science and the scientific method in astronomy.
2. Know the major scientific developments in astronomy and the impacts on society and the environment.
3. Know relevant processes that govern physical systems in astronomy.

#### II. Critical Thinking

1. Formulate empirically-testable hypotheses derived from the study of physical processes in astronomy.
2. Apply logical reasoning skills effectively through scientific criticism and argument in astronomy.
3. Apply techniques of discovery and critical thinking effectively to solve experiments and to evaluate outcomes.

#### III. Communication

1. Communicate scientific findings clearly and effectively using oral, written, and/or graphic forms.
2. Write effectively in several forms, such as in research papers and laboratory reports.

**HUMANITIES:** Humanities courses provide instruction in the key themes, principles, and terminology of a humanities discipline. These courses focus on the history, theory and methodologies used within that discipline, enabling you to identify and to analyze the key elements, biases and influences that shape thought. These courses emphasize clear

and effective analysis and approach issues and problems from multiple perspectives.

**STUDENT LEARNING OUTCOMES** for a humanities course in a discipline are as follows:

I. Content

1. Know the history, underlying theory, and methodologies used in that discipline.

II. Critical Thinking

1. Identify and analyze key elements, biases and influences that shape thought within the discipline.
2. Approach issues and problems within that discipline from multiple perspectives.

III. Communication

1. Communicate knowledge, thoughts and reasoning clearly and effectively in forms appropriate to that discipline, individually and/or in groups.

**INTERNATIONAL:** International courses provide instruction in the values, attitudes and norms that constitute the culture of countries outside the United States. These courses lead you to understand how geographic location, development level and geopolitical influences affect these cultures. Through analysis and evaluation of your own cultural norms and values in relation to those held by the citizens of other countries, you will develop a cross-cultural understanding of the rest of the world.

**STUDENT LEARNING OUTCOMES** for an international course are as follows:

I. Content

1. Know the values, attitudes and norms that shape the cultural differences of peoples who live in countries other than the United States.
2. Know the roles of geographic location, development level and geopolitical influences on the lives of citizens of other countries.

II. Critical Thinking

Analyze and evaluate your cultural norms and values in relation to those held by citizens of other countries.

**COURSE POLICIES:**

This is a one-term lecture class. The content in the class website is divided into modules where you can access the assignments, lecture notes, and any other material related to the course. The due dates for all assignments will be listed in the Course Calendar.

**REQUIREMENTS:** *Students are expected to:*

- *Attend all classes and participate in class activities*
- *Complete all online quizzes in a timely fashion.*
- *Complete one class project and three proctored exams.*

**COURSE TECHNOLOGY:** *Access to reliable wi-fi, webcam and a computer is required for all students. Competency in the basic use of a computer is required. Course work will require use of a computer and a broadband connection to the Internet. For additional information on UF College of Liberal Arts and Sciences policy regarding computer requirements you can visit: <http://it.clas.ufl.edu/policies/student-computer-requirement>.*

**COURSE EVALUATION BY STUDENTS:** Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.

## UF POLICIES:

**UNIVERSITY POLICY ON ACCOMMODATING STUDENTS WITH DISABILITIES:** Students requesting accommodation for disabilities must first register with the Dean of Students Office (<http://www.dso.ufl.edu/drc/>). The Dean of Students Office will provide documentation to the student who must then provide this documentation to the instructor when requesting accommodation. You must submit this documentation prior to submitting assignments or taking the quizzes or exams. Accommodations are not retroactive, therefore, students should contact the office as soon as possible in the term for which they are seeking accommodations.

**UNIVERSITY POLICY ON ACADEMIC MISCONDUCT:** Academic honesty and integrity are fundamental values of the University community. Students should be sure that they

understand the UF Student Honor Code at <https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/>

This is an excerpt from the Academic Honesty Guidelines and Student Conduct Code in the University of Florida Undergraduate Catalog:

“Academic Honesty: The university requires all members of its community to be honest in all endeavors. A fundamental principle is that the whole process of learning and pursuit of knowledge are diminished by cheating, plagiarism, and other acts of academic dishonesty. In addition, every dishonest act in the academic environment affects other students adversely, from the skewing of the grading curve to giving unfair advantage for honors or for professional or graduate school admission. Therefore, the university will take severe action against dishonest students. Similarly, measures will be taken against faculty, staff, and administrators who practice dishonest or demeaning behavior.”

Cheating is not tolerated in this class. Everyone in this class is expected to follow the University of Florida Honor Code: *We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.* Any student suspected of academic misconduct will be automatically referred to the Honor Code Chancellor as required by UF.

On all work submitted for credit by students at the university, the following pledge is either required or implied: *"On my honor, I have neither given nor received unauthorized aid in doing this assignment."*

**NETIQUETTE: COMMUNICATION COURTESY:** All members of the class are expected to follow rules of common courtesy in all email messages, threaded discussions and chats. <http://sfrc.ufl.edu/courses/distance/NetiquetteGuideforOnlineCourses.pdf>

**UF ONLINE HANDBOOK:** Additional information can be found on <http://handbook.uflonline.ufl.edu/>

## GETTING HELP:

For issues with technical difficulties for E-learning, **do NOT contact the instructor**, please contact the UF Help Desk at:

- [Learning-support@ufl.edu](mailto:Learning-support@ufl.edu)
- (352) 392-HELP - select option 2
- <https://lss.at.ufl.edu/help.shtml>

### UF Counseling Services:

- On-campus resources are available at the UF Counseling & Wellness Center (392-1575) for students experiencing personal or stress related problems.

### COVID-19:

In response to COVID-19, the following recommendations are in place to maintain your learning environment, to enhance the safety of our in-classroom interactions, and to further the health and safety of ourselves, our neighbors, and our loved ones.

- If you are not vaccinated, get vaccinated. Vaccines are readily available and have been demonstrated to be safe and effective against the COVID-19 virus. Visit [one.ufl.edu](https://one.ufl.edu) for screening / testing and vaccination opportunities.
- **If you are sick, stay home.** Please call your primary care provider if you are ill and need immediate care or the UF Student Health Care Center at 352-392-1161 to be evaluated.
- Course materials will be provided to you with an excused absence (documentation required), and you will be given a reasonable amount of time to make up work.



## August

- 24 Classes begin, Introduction, Syllabus, Class Project
- 26 Intro class project
- 29 Celestial Sphere 1
- 31 Celestial Sphere 2

## September

- 2 Celestial Sphere 3
- 5 Labor Day, No Class
- 7 Celestial Sphere 4
- 9 Celestial Sphere 5
- 12 Celestial Sphere 6
- 14 Chapter 1 Prehistoric Europe
- 16 Chapter 1 Prehistoric Europe
- 19 Chapter 1 Prehistoric Europe, **Instrument Proposal Due**
- 21 Chapter 1 Inca
- 23 Chapter 1 Planetary Motion
- 26 Chapter 1 Maya
- 28 Chapter 1 Maya
- 30 Sky Chart

## October

- 3 Chapter 2. Egypt
- 5 Chapter 2. Babylon
- 7 Homecoming, No Class
- 10 **Exam 1 (Celestial Sphere, Chapter 1)**
- 12 Chapter 2. Greece

|          |   |
|----------|---|
| 14       | Chapter 2. Greece   |
| 17       | Chapter 2. Greece   |
| 19       | Chapter 2. Greece (Ptolemy)                                   |
| 21       | Chapter 3. Islamic Astronomy                                  |
| 24       | Chapter 3. Islamic Astronomy, <b>Instrument Completed Due</b> |
| 26       | Chapter 4. Medieval Astronomy                                 |
| 28       | Chapter 4. Medieval Astronomy/Copernicus                      |
| 31       | Chapter 4. Copernicus   |
| November |   |
| 3        | Chapter 3. Islamic Astronomy                                  |
| 4        | Chapter 3-4. Islamic Astronomy/Medieval Astronomy             |
| 7        | Chapter 4. Medieval Astronomy                                 |
| 9        | <b>Exam 2 (Chapters 2, 3, 4)</b>                              |
| 11       | No Class, Veterans Day  |
| 14       | Chapter 5. Tycho  |
| 16       | Chapter 5. Tycho/Kepler                                       |
| 18       | Chapter 5. Galileo  |
| 21       | Chapter 5. Galileo/Descartes                                  |
| 23, 25   | No Class - Thanksgiving Break                                 |
| 28       | Chapter 6. Newton   |
| 30       | Chapter 6. Newton   |
| December |   |
| 2        | <b>Instrument Presentation</b>                                |
| 5        | <b>Instrument Presentation</b>                                |
| 7        | <b>Exam 3 (Chapters 5 &amp; 6)</b>                            |