

HISTORY OF ASTRONOMY THROUGH NEWTON

AST3043, CLASS NUMBER 11932, 3 CREDITS, FALL 2020

INSTRUCTOR: *Naibi Mariñas*

Office number: Online Fall 2020

E-mail address: (use Canvas Inbox)

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

CLASSROOM: *Zoom Conference – Canvas – Class website*

OFFICE HOURS: *Zoom Conference – Tuesdays 2:00 – 3:00 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. Since some assignments in this class are due on Sunday, I recommend working on them early and asking any questions before 5 pm on Fridays.

*The instructor will use the **Announcements** in the class website to communicate with the whole class. 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.

REQUIRED 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 reading and learn the material.

PARTICIPATION/CLASS ACTIVITIES (10 %): Attendance and participation in zoom classes 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 a video to present their instrument and data 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 can be found in the class website.

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 using Honorlock. The exams are closed notes, closed book and no help is allowed during the exams. Browsing or talking during an exam will raise red flags and exams can be invalidated and submitted to the Dean of Students Student Conduct and Conflict Resolution according to UF policies.

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.* **Birthdays, weddings, and trips out of town are not excuses for taking a make-up exam.**

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, fill in the blank lecture notes, and any other material related to the course. The due dates for all assignments are listed in the Course Calendar.

REQUIREMENTS: *Students are expected to:*

- **Attend all zoom classes**
- *Complete all assignments and 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 <http://www.dso.ufl.edu/students.php>. All assignments suspected of a violation of the student conduct code will be directly submitted to the Student Conduct and Conflict Resolution for investigation.

NETIQUETTE: COMMUNICATION COURTESY: In this class students can use the Canvas inbox e-mail, discussion, and chat in the class website to communicate with the instructor and other students. All members of the class are expected to follow rules of common courtesy in all email messages and chats. <http://teach.ufl.edu/wp-content/uploads/2012/08/NetiquetteGuideforOnlineCourses.pdf>

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
- (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.

AST3043 TENTATIVE SCHEDULE

FALL 2020

August

31 Classes begin, Introduction, Syllabus, Class Project

September

2 Celestial Sphere 1

4 Celestial Sphere 2

7 Labor Day

9 Celestial Sphere 3

11 Celestial Sphere 4

14 Celestial Sphere 5

16 Celestial Sphere 6

18 Chapter 1 Prehistoric Europe 1

21 Chapter 1 Prehistoric Europe 2

23 Chapter 1 Incas

25 Chapter 1 Maya, **Instrument Proposal Due**

28 Chapter 1. Maya

30 Chapter 2. Egypt

October

2 Homecoming. No Class

5 **Exam 1 (Celestial Sphere, Chapter 1)**

7 Chapter 2. Greece 1

9 Chapter 2. Greece 2

12 Chapter 2. Greece 3

14 Chapter 2. Greece 4

16 Chapter 3. Islamic Astronomy 1

- 19 Chapter 3. Islamic astronomy 2
- 21 Chapter 4. Medieval Astronomy 1 Chapter 4. Copernicus
- 23 Chapter 4. Medieval Astronomy 2 - **Instrument Completed**
- 26 Chapter 4. Copernicus 1
- 28 Chapter 4. Copernicus 2
- 30 Chapter 5. Tycho

November

- 2 **Exam 2 (Chapters 2, 3, 4)**
- 4 Chapter 5. Tycho/Kepler
- 6 Chapter 5. Kepler
- 9 Chapter 5. Galileo 1
- 11 No Class - Veterans Day
- 13 Chapter 5. Galileo 2
- 16 Chapter 5. Descartes
- 18 Chapter 6. Newton 1
- 20 Chapter 6. Newton 2
- 23 Chapter 6. Newton 3
- 25, 27 No Class - Thanksgiving Break
- 30 Chapter 6. Newton 4 - **Video Presentation Due**

December

- 2 Chapter 6. Newton 5
- 4 Chapter 6. Newton 6 - **Peer-Reviews Due/competition results**
- 7 Exam Review
- 9 **Exam 3 (Chapters 5 & 6)**