

HISTORY OF ASTRONOMY THROUGH NEWTON

AST3043, CLASS NUMBER 12186, 3 CREDITS, FALL 2019

INSTRUCTOR: *Naibi Mariñas*

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MEETING TIMES: *MWF, 6th Period (12:50 to 1:40 pm)*

CLASSROOM: *FLG 230*

OFFICE HOURS: *will be posted on the Canvas calendar weekly*

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

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.

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 %
Project	40 %
In-class Exams (3 exams)	50 %

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	E	< 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. The format of the quizzes is similar to the format of the exams and can help you prepare for exams.

There will be NO MAKE UP quizzes. To account for any technical or personal circumstances that might hinder the performance on a quiz, the lowest quiz will be dropped at the end of the semester.

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. Students can choose to work in groups of two or individually. The instructor must approve all projects and collaborations. All students will present their instrument and data to the class at the end of the semester. You will also evaluate all peer presentations. More information on this project will be presented in class.

EXAMS (50 %): There are three one-hour exams in the course, scheduled in the regular classroom at the normal class period on the dates listed in the class. If it's necessary to reschedule an in-class exam, I'll post an announcement in the class website and send an e-mail to the class. The in-class tests 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.

Students should bring a number 2 pencil and their UF ID to take the exam. All students have to present their UF ID's to the exam proctors at the end of the exam. **Without an ID, your exam will not be graded.**

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 classes**
- *Complete all reading assignments and online quizzes in a timely fashion.*

- Complete one class project and three exams.

COURSE TECHNOLOGY: Access to and on-going use of 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 required to provide feedback on the quality of instruction in this course based on 10 criteria. These evaluations are conducted online at **GATOR RATER** <https://evaluations.ufl.edu/>. The evaluation Web site is typically open during the last two or three weeks of the semester, but specific times when the site opens will be announced. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/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>.

NETIQUETTE: COMMUNICATION COURTESY: In this class students can use e-mail 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/docs/NetiquetteGuideforOnlineCourses.pdf>

GETTING HELP:

For issues with technical difficulties with the class website, please contact the UF Help Desk at:

- (352) 392-HELP - select option 2 or <https://lss.at.ufl.edu/help.shtml>

AST3043 TENTATIVE SCHEDULE

FALL 2019

August

- 21 Classes begin, Introduction, Syllabus
- 23 Intro 2 Project - Instruments
- 26 Celestial Sphere 1
- 27 Celestial Sphere 2
- 29 Celestial Sphere 3

September

- 2 Labor Day - No Class
- 4 Celestial Sphere 4 - Sky Chart Activity
- 6 Celestial Sphere 5 - The Moon
- 9 Celestial Sphere 6 - Moon and Celestial Sphere Activity
- 11 Chapter 1 Europe
- 13 Chapter 1 Europe
- 16 Chapter 1 Incas
- 18 Chapter 1 Mayas
- 20 Chapter 1 Mayas, **Instrument Proposal Due**
- 23 Chapter 2 Babylon
- 25 Chapter 2 Egypt
- 27 Chapter 2. Greece
- 30 **Exam 1 (Celestial Sphere, Chapter 1)**

October

- 2 Chapter 2. Greece
- 4 Homecoming. No Class
- 7 Chapter 2. Greece

- 9 Chapter 2. Greece
11 Chapter 3. Islamic astronomy
14 Chapter 3. Islamic astronomy
16 Chapter 4. Medieval Astronomy
18 Chapter 4. Medieval Astronomy
21 Chapter 4. Copernicus - **Instrument Completed**
23 Chapter 4. Copernicus
25 Chapter 5. Tycho
28 **Exam 2 (Chapters 2, 3, 4)**
30 Chapter 5. Tycho/Kepler

November

- 1 Chapter 5. Kepler
4 Chapter 5. Galileo
6 Chapter 5. Galileo
8 Chapter 5. Descartes
11 No Class - Veterans Day
13 Chapter 6. Newton
15 Chapter 6. Newton
18 Chapter 6. Newton
20 Chapter 6. Newton
22 **Final Presentations**
25 **Final Presentations**
27, 29 No Class - Thanksgiving Break

December

- 2 **Exam 3 (Chapters 5 & 6)**