HISTORY OF ASTRONOMY THROUGH NEWTON

AST3043, SECTION 4325, 24595, 3 CREDITS, SPRING 2025

INSTRUCTOR: *Naibi Mariñas*

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

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

CLASSROOM: *Turlington 2319*

OFFICE: *Bryant Space Science Center 224*

OFFICE HOURS: To be announced

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: MAC1105 or MAC1114. In addition, a high school level knowledge of geometry and trigonometry is needed.

RECOMMENDED TEXTS: *There are no required textbook for this course. The following books are used to create the class material. The first book on the list provides an overview of the content we will cover in class.*

1. *Michael Hoskin, The Cambridge Concise History of Astronomy (Cambridge University Press, 1999) – Available at the Marston Science Library*
2. *Anthony F. Aveni, Skywatchers: A Revised and Updated Version of Skywatchers of Ancient Mexico (University of Texas Press, 2001) – Available at UF Latin America and Caribbean Collection.*
3. *James Evans, The History and Practice of Ancient Astronomy (Oxford University Press, 1998)*
4. *Mordechai Feingold, The Newtonian Moment (Oxford University Press, 2004)*
5. *Rene Taton & Curtis Wilson, Planetary Astronomy from the Renaissance to the rise of astrophysics, Tycho Brahe to Newton (Cambridge University Press, 2003)*

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. Students building the best instruments can place their instruments in an exhibit at the lobby of the Bryant Space Science Center or the Marston Science Library. Examples of these instruments will be shown in class.

Instrument Proposal: An instrument proposal needs to include the name of the instrument, materials that will be used, the data that will be collected with the instrument, and references. The instructor must approve all instrument proposals before construction. Proposals are due September 18th, 2023.

Instrument Completed and Guide to Build the Instrument: You will have a month to build your instrument after your proposal is approved. Keep in mind that the instruments must be solid and functional. Instruments also need to look historically accurate. The Marston Science Library has a tool lending collection that students can use to build their instruments.

Together with your instrument, you will have to submit a document that includes: (1) a description of the instrument and its historical background, including its uses in a historical context, (2) a step-by-step guide on how to build your instrument, supplemented by photos of your building process and a photo of the completed

instrument, (3) a list of any problems encountered during the building process and how they were solved. If the problems could not be solved, explain how they will affect the data you will collect. Completed instruments are due October 23rd, 2023.

Instrument Presentation: All students will present their instrument and the data collected to the class during the last weeks of the semester. The presentations will be in class. Students presenting will be assigned different display areas in the classroom and should be ready to answer any questions related to their instrument and data collected, including demonstrations of historical uses. Your display will consist of: (1) your instrument, (2) the data collected, including analysis of the data, (3) the step-by-step guide to building the instrument with images (you submitted this previously, but you need a copy for your classmates to see when they evaluate your instrument). Presentations will be evaluated by your peers, TAs, and instructor. The instructor will provide the final grade. All students that are not presenting during one class period will be doing the evaluations using the rubric below.

Be thoughtful and fair in your evaluations and use the rubric categories **Reviewer's name:**
Presenter's name:

Instrument Presentation

Criteria	Ratings			Pts
The student has an instrument	Full Marks 5 pts	No Marks 0 pts		5 pts
Materials and Construction	The instrument is solid, built with appropriate materials, accurate and functions very well 25 pts	The instrument is functional, but the materials/construction is not sturdy. It could be improved. 19 pts	The instrument is flimsy, materials bent, non functional 5 pts	25 pts
Finishing	The student took care to make the instrument historically accurate. The instrument resembles ancient instruments from that time period. 10 pts	The instrument is well done, but nothing was done to make it look historically accurate. 5 pts		10 pts
Building Guide	The step by step guide is easy to understand and the pictures illustrate the process. It is easy to follow 15 pts	The step by step guide is confusing. Not all the steps or documentation is included. 8 pts	The student didn't have the step by step guide 0 pts	15 pts
Historical Use	The student explained how the historical used of the instrument 5 pts	The student didn't explained the historical use of the instrument 0 pts		5 pts
Use	The student demonstrated how he used the instrument. The explanation was easy to understand. 15 pts	The student demonstrated how he used the instrument, but not very clearly. I am still not sure how he used it from his explanation. 8 pts	The student didn't demonstrate how he used the instrument. 0 pts	15 pts
Description of criterion	The data collected reflects the historical use of the instrument. There are multiple measurements to show how the instrument works. The data is reproducible and relatively accurate. 25 pts	The data collected reflects the historical use of the instrument, but there is very little data and/or no information about the errors of the measurements. 13 pts	No data was collected with the instrument. 0 pts	25 pts
Total Points: 100				

Comments:

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 ASSIGMENT 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.

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 science courses provide instruction in the basic concepts, theories, and terms of science and the scientific method in the context of the physical sciences. Courses focus on major scientific developments and their impacts on society, science and the environment, and the relevant processes that govern physical systems. Students will formulate empirically-testable hypotheses derived from the study of physical processes, apply logical reasoning skills through scientific criticism and argument, and apply techniques of discovery and critical thinking to evaluate outcomes of experiments.

STUDENT LEARNING OUTCOMES

Students will be able to:

I. Content:

1. Define basic concepts, theories, and terminology of astronomy through history and describe how the scientific method evolved over time. Students will be assessed through quizzes and exams. Student learning will be assessed through quizzes, exams, and in-class activities.

2. Describe major scientific developments in astronomy and the relationship

between society and scientific discoveries. Student learning will be assessed through quizzes, exams, and in-class activities.

3. Apply relevant processes that govern physical systems in astronomy. Student learning will be assessed through in-class activities and the class project.

II. Critical Thinking

1. Formulate empirically-testable hypotheses derived from the study of physical processes in astronomy. Apply logical reasoning skills effectively through scientific criticism and argument in astronomy to solve experiments and evaluate outcomes. Student learning will be assessed through the class project and in-class activities.

III. Communication

1. Communicate scientific findings clearly and effectively using oral, written, and/or graphic forms. Student learning will be assessed through the class project written report and oral presentations.

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

Students will be able to:

I. Content

1. Describe the history, underlying theories, and methodologies used in astronomy from the Neolithic to XVIII century. Student learning will be assessed through quizzes, exams, in-class activities and class project.

II. Critical Thinking

1. Identify and analyze key elements, biases and influences that shape astronomical ideas over time. Student learning will be assessed through quizzes, exams, in-class activities, and class project.

2. Approach issues and problems within astronomy from multiple perspectives.

Student learning will be assessed through in-class activities and class project.

III. Communication

1. Communicate knowledge, thoughts, and reasoning clearly and effectively. Student learning will be assessed through in-class activities and class project presentation.

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

Students will be able to:

I. Content

1. Identify, describe, and explain the historical, cultural, economic, political, and social experiences and processes that have shaped the development of scientific theories in astronomy. Student learning will be assessed through quizzes and exams.

II. Critical Thinking

1. Analyze and reflect on the ways in which cultural, economic, political, and social systems and beliefs mediate our understandings of the world. Student learning will be assessed through in-class activities and discussions.

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.ufonline.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
- (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.

ANNOTATED TENTATIVE WEEKLY SCHEDULE

WEEK/ DATE	ACTIVITY	TOPIC/ASSIGNMENT (QUESTION/SUBJECT)
Week 1	Topic	Celestial Sphere
	Summary	Introduction to class. The Celestial Sphere. Equatorial Coordinate System. The Observer's Sky. Stellar motion.
	Readings/Works	Syllabus
	Assignment	Module 1 Class Website – Watch Celestial Sphere videos Review information on Ancient Astronomical Instruments
Week 2	Topic	Celestial Sphere
	Summary	Constellations. Zodiac. Solar motion. Equinoxes and solstices. Tropical and sidereal day. Tropical and Sidereal year.
	Readings/Works	Celestial Sphere Glossary of Terms (Module 1)
	Assignment	Star Wheel Birthday Sky Chart Review information on Ancient Astronomical Instruments
Week 3	Topic	Celestial Sphere
	Summary	Lunar motion. Lunar phases. Ascending and descending node of the moon. Eclipses.

WEEK/ DATE	ACTIVITY	TOPIC/ASSIGNMENT (QUESTION/SUBJECT)
	Assignment	Lunar Calendar Quiz Module 1 (Celestial Sphere) Due Work on Instrument Proposal
Week 4	Topic	Astronomy Before History: Europe
	Summary	Alignment and predictive astronomy. Stone circles. Stonehenge and Newgrange: description, main features, studies, astronomical significance.
	Readings/Works	The Concise History of Astronomy – Chapter 1 Stonehenge Landscape Through Time: https://www.english-heritage.org.uk/visit/places/stonehenge/history-and-stories/history/
	Assignment	Instrument Proposal Due
Week 5	Topic	Astronomy Before History: Pre-Columbian America
	Summary	Inca: Coricancha symbolism, Cuzco, Machu Pichu. Alignments and calendar. Inferior and superior planets. Configurations. Retrograde motion.
	Readings/Works	
Week 6	Topic	Astronomy Before History: Maya

WEEK/ DATE	ACTIVITY	TOPIC/ASSIGNMENT (QUESTION/SUBJECT)
	Summary	Maya classical period. Uaxactum, Uxmal, Chichen Itza. Calendar and astronomical alignments. Vigesimal number system. Codices. Maya Star Wars. Predictive astronomy.
	Readings/Works	Breaking the Maya Code (documentary)
	Assignment	Module 2 (Astronomy Before History) Quiz Due
Week 7	Topic	Astronomy in Antiquity: Egypt and Babylon and early Greek Astronomy.
	Summary	Egypt: Book of Nut. Sirius and the calendar. Decans. Pyramids and alignments. Babylon: Sexagesimal number system. Ephemerides. Goal year. Observations. Calendars. Metonic cycle. Greece: Thales, Anaxagoras, Pythagoras. The Atomists. Eudoxus
	Readings/Works	The Concise History of Astronomy – Chapter 2 Stars Over Ancient Babylon video
	Assignment	Exam 1 (Modules 1 and 2)
Week 8	Topic	Astronomy in Antiquity: Greece
	Summary	Early astronomy. Plato and Aristotle. Spherical Earth. Parallax. Hellenistic astronomy: Aristarchus, Eratosthenes, Hipparchus, Ptolemy. Geometrical models shortcoming and advantages.
	Readings/Works	Ptolemy: Almagest. Book 1: https://bertie.ccsu.edu/naturesci/Cosmology/Ptolemy.html

WEEK/ DATE	ACTIVITY	TOPIC/ASSIGNMENT (QUESTION/SUBJECT)
	Assignment	Module 3 Quiz (Astronomy in Antiquity) Due Measuring the Earth Circumference Class Activity
Week 9	Topic	Islamic Astronomy
	Summary	Islamic Golden Age. Calendar, alignments, astronomical instruments. Zij. House of Wisdom and observatories. Biruni, al-Zarqali, al-Tusi, al-Shatir.
	Readings/Works	The Concise History of Astronomy – Chapter 3
	Assignment	Module 4 Quiz (Islamic Astronomy) Due Completed Instrument Report Due
Week 10	Topic	European Medieval Astronomy
	Summary	Astronomy in the Middle Ages: Capella. Universities. Thomas Aquinas. Jean Buridan. Nicole Oresme. George Peurbach. Regiomontanus, Nicalaus of Cusa. Copernicus. Reinhold. Julian and Gregorian calendar.
	Readings/Works	The Concise History of Astronomy – Chapter 4 The Swerve by Stephen Greenblatt (selected fragments from Chapter 2 “The Moment of Discovery”) Dante in Orbit by Stebbins, F. A.
	Assignment	Module 5 Quiz (Medieval Astronomy) Due Exam 2 (Modules 3, 4, 5)

WEEK/ DATE	ACTIVITY	TOPIC/ASSIGNMENT (QUESTION/SUBJECT)
Week 11	Topic	Geometry to Physics
	Summary	Tycho. Kepler
	Readings/Works	The Concise History of Astronomy – Chapter 5
Week 12	Topic	Geometry to Physics
	Summary	Galileo. Descartes
	Assignment	Module 6 Quiz (Geometry to Physics) Due
Week 13	Topic	Newton
	Summary	Hook. Huygens. Hailey. Newton.
	Assignment	Complete data collection for the instrument presentation
	Readings/Works	The Concise History of Astronomy – Chapter 6
Week 14, 15	Topic	Newton Instrument Final Oral/Poster Presentations
	Assignment	Module 7 Quiz (Newton) Due Project Presentations Exam 3 (Modules 6 and 7)

ANNOTATED TENTATIVE WEEKLY SCHEDULE

WEEK/ DATE	ACTIVITY	TOPIC/ASSIGNMENT (QUESTION/SUBJECT)
Week 1	Topic	Celestial Sphere
	Summary	Introduction to class. The Celestial Sphere. Equatorial Coordinate System. The Observer's Sky. Stellar motion.
	Readings/Works	Syllabus
	Assignment	Module 1 Class Website – Watch Celestial Sphere videos Review information on Ancient Astronomical Instruments
Week 2	Topic	Celestial Sphere
	Summary	Constellations. Zodiac. Solar motion. Equinoxes and solstices. Tropical and sidereal day. Tropical and Sidereal year.
	Readings/Works	Celestial Sphere Glossary of Terms (Module 1)
	Assignment	Star Wheel Birthday Sky Chart Review information on Ancient Astronomical Instruments
Week 3	Topic	Celestial Sphere
	Summary	Lunar motion. Lunar phases. Ascending and descending node of the moon. Eclipses.

WEEK/ DATE	ACTIVITY	TOPIC/ASSIGNMENT (QUESTION/SUBJECT)
	Assignment	Lunar Calendar Quiz Module 1 (Celestial Sphere) Due Work on Instrument Proposal
Week 4	Topic	Astronomy Before History: Europe
	Summary	Alignment and predictive astronomy. Stone circles. Stonehenge and Newgrange: description, main features, studies, astronomical significance.
	Readings/Works	The Concise History of Astronomy – Chapter 1 Stonehenge Landscape Through Time: https://www.english-heritage.org.uk/visit/places/stonehenge/history-and-stories/history/
	Assignment	Instrument Proposal Due
Week 5	Topic	Astronomy Before History: Pre-Columbian America
	Summary	Inca: Coricancha symbolism, Cuzco, Machu Pichu. Alignments and calendar. Inferior and superior planets. Configurations. Retrograde motion.
	Readings/Works	
Week 6	Topic	Astronomy Before History: Maya

WEEK/ DATE	ACTIVITY	TOPIC/ASSIGNMENT (QUESTION/SUBJECT)
	Summary	Maya classical period. Uaxactum, Uxmal, Chichen Itza. Calendar and astronomical alignments. Vigesimal number system. Codices. Maya Star Wars. Predictive astronomy.
	Readings/Works	Breaking the Maya Code (documentary)
	Assignment	Module 2 (Astronomy Before History) Quiz Due
Week 7	Topic	Astronomy in Antiquity: Egypt and Babylon and early Greek Astronomy.
	Summary	Egypt: Book of Nut. Sirius and the calendar. Decans. Pyramids and alignments. Babylon: Sexagesimal number system. Ephemerides. Goal year. Observations. Calendars. Metonic cycle. Greece: Thales, Anaxagoras, Pythagoras. The Atomists. Eudoxus
	Readings/Works	The Concise History of Astronomy – Chapter 2 Stars Over Ancient Babylon video
	Assignment	Exam 1 (Modules 1 and 2)
Week 8	Topic	Astronomy in Antiquity: Greece
	Summary	Early astronomy. Plato and Aristotle. Spherical Earth. Parallax. Hellenistic astronomy: Aristarchus, Eratosthenes, Hipparchus, Ptolemy. Geometrical models shortcoming and advantages.
	Readings/Works	Ptolemy: Almagest. Book 1: https://bertie.ccsu.edu/naturesci/Cosmology/Ptolemy.html

WEEK/ DATE	ACTIVITY	TOPIC/ASSIGNMENT (QUESTION/SUBJECT)
	Assignment	Module 3 Quiz (Astronomy in Antiquity) Due Measuring the Earth Circumference Class Activity
Week 9	Topic	Islamic Astronomy
	Summary	Islamic Golden Age. Calendar, alignments, astronomical instruments. Zij. House of Wisdom and observatories. Biruni, al-Zarqali, al-Tusi, al-Shatir.
	Readings/Works	The Concise History of Astronomy – Chapter 3
	Assignment	Module 4 Quiz (Islamic Astronomy) Due Completed Instrument Report Due
Week 10	Topic	European Medieval Astronomy
	Summary	Astronomy in the Middle Ages: Capella. Universities. Thomas Aquinas. Jean Buridan. Nicole Oresme. George Peurbach. Regiomontanus, Nicalaus of Cusa. Copernicus. Reinhold. Julian and Gregorian calendar.
	Readings/Works	The Concise History of Astronomy – Chapter 4 The Swerve by Stephen Greenblatt (selected fragments from Chapter 2 “The Moment of Discovery”) Dante in Orbit by Stebbins, F. A.
	Assignment	Module 5 Quiz (Medieval Astronomy) Due Exam 2 (Modules 3, 4, 5)

WEEK/ DATE	ACTIVITY	TOPIC/ASSIGNMENT (QUESTION/SUBJECT)
Week 11	Topic	Geometry to Physics
	Summary	Tycho. Kepler
	Readings/Works	The Concise History of Astronomy – Chapter 5
Week 12	Topic	Geometry to Physics
	Summary	Galileo. Descartes
	Assignment	Module 6 Quiz (Geometry to Physics) Due
Week 13	Topic	Newton
	Summary	Hook. Huygens. Hailey. Newton.
	Assignment	Complete data collection for the instrument presentation
	Readings/Works	The Concise History of Astronomy – Chapter 6
Week 14, 15	Topic	Newton Instrument Final Oral/Poster Presentations
	Assignment	Module 7 Quiz (Newton) Due Project Presentations Exam 3 (Modules 6 and 7)