

**PHYS 1401: Astronomy (updated 2/17/21)**  
**Course Syllabus for Spring 2021, TR 1:00-2:25 pm**

Instructor: Dr. Wayne Keith: 793-3874, [keith.wayne@mcm.edu](mailto:keith.wayne@mcm.edu)  
Office Hours: S 110-C: MTWRF 9-11, and MWF 1-2:30  
Web: <http://www.mcm.edu/~keith.wayne>  
Text: *Horizons: Exploring the Universe (14<sup>th</sup>)*, by M. Seeds  
Required: tablet PC, scientific calculator, paper, pen/pencil

**Course Description:** Introduction to Astronomy is an algebra-based science course revealing the workings of the scientific method through the study of our understanding of celestial bodies and processes. The objective for the student is to develop the skills necessary to critically analyze claims and distinguish between science and pseudoscience. Astronomy is a subject suitable for all students, both science and non-science majors. This is because it involves seeking out and trying to understand the basic laws of nature. Problem solving and critical thinking are valuable skills, no matter what profession you may go into. You will develop these skills through working through homework problems on your own, and working in groups on the laboratory exercises.

**Course Goals:** The objective for the student is to develop the skills necessary to critically analyze claims and distinguish between science and pseudoscience, and to increase factual knowledge of Astronomy.

**Grading: 10%** Daily grades: Class participation, attendance, Moodle quizzes based on the reading (due before class period).

**20%** Homework: Assignments will be made in class and posted online. Homework will be due at the beginning of class on the date indicated.

**25%** Laboratory: See separate lab syllabus for details.

**30%** Exams (10% each): Three in-class exams.

**15%** Final exam: Comprehensive, but concentrating on the final quarter of the course.

**Early Grades:** You will receive a during-term grade for this course by the 5th week of classes and after midterm. You can access your grades through Moodle or MyMcM. If your during-term grade is below a C-, you will receive a message from the Mindset for Success Office regarding your academic underperformance in this course. This email will contain information about several resources that can help you.

**Attendance/Make up policy:** Attendance is required. Make-up exams will be given for excused absences only at the discretion of the instructor. Contacting the instructor via email or phone prior to missing class for any reason is strongly encouraged, even if it is for a school sponsored event. Students are responsible for keeping up with the due dates of course material whether or not they are in class.

**Classroom Rules:** Students are expected to be present and on time for all class meetings. Excessive unexcused absences (more than 3 consecutive) may result in the student being dropped from the course. Ringing cell phones and other disruptions during class may result in a loss of daily grade points or other penalties. Late homework loses 5% per class period. Computers should be used for lab-related purposes only. Curves on exams will be given ONLY to students who have completed the homework for the tested chapters.

**Final notes:** Class discussion is strongly encouraged; please feel free to ask questions, during class or outside of class, about anything that is not clear. Properly preparing for class by reading the text and keeping up with the quizzes and homework are the most important factors in doing well in this course. Students are encouraged to bring astronomy related current events to class for discussion.

**ADA Policy:** If you have a documented disability that may impact your performance in this class and for which you may require accommodations, you must be registered with and provide documentation of your disability to the Disability Services Office, President Hall, 793-4880.

**Special Note for Pandemic:** During the Coronavirus pandemic, special University policies related to Personal Protective Equipment, cleaning, and social distancing have been put into place. All University policies WILL be followed in this class, including properly worn face coverings. Each student will get ONE WARNING regarding improper or missing face covering, after which the student will be EJECTED FROM CLASS and marked absent. Repeat offenders will be dropped from the course. Please also note that attending class or lab remotely is ONLY available for students with a documented reason such as illness or quarantine.

### PHYS 1401 Course Schedule

All dates and topics are tentative and subject to change except **bold** dates.

Date	Lecture #	Tentative Topic	Homework
<b>1/12</b>		<b>NO CLASS</b>	
<b>1/14</b>		<b>NO CLASS</b>	
1/19	1	Introduction and Scientific Method	1. Ch1: RQ 2,5 P 2,7 LL 3 Ch2: RQ 6,15,16 P 1,5
1/21	2	Ch 1 Here and Now	
1/26	3	Ch 2 The Sky	
1/28	4	Ch 3 Cycles of the Sky	2. Ch3: RQ 4,12 P 1,6 LL 1 Ch4: RQ 8,15 DQ 3 P 4,9
2/2	5	Ch 4 History of Astronomy	
2/4	6	Ch 4 Galileo, Kepler and Newton	
2/9	7	Ch 5 The Basics of Telescopes	3. Ch5: RQ 1,6,8,9 DQ 1 P 2,4,5 LL 1,3
2/11		<b>NO CLASS</b>	
2/16		<b>NO CLASS</b>	
2/18	8	Ch 5 Advanced Telescopes	
2/23		<b>Exam 1</b>	
2/25	9	Ch 6 Starlight & Spectroscopy	4. Ch6: RQ 2,8 P 1,7 LL 2 Ch7: RQ 1,12 DQ 2 P 5,8
3/2	10	Ch 7 The Sun	
3/4	11	Ch 8 The Family of Stars	5. Ch8: RQ 1,10,18 P 2,6,11 Ch9: RQ 2,17 P 8,16
3/9	12	Ch 9 Formation and Structure of Stars	
3/11	13	Ch 10 The Deaths of Sun-Like Stars	6. Ch10: RQ 3,6,10,15 P 1,5 Ch11: RQ 4,14 P 8 LL 2
3/16	14	Ch 10 Novae and Supernovae	
3/18	15	Ch 11 Neutron Stars and Black Holes	
3/23		<b>Exam 2</b>	
3/25	16	Ch 12 The Milky Way Galaxy	7. Ch12: RQ 2,3 P 8 Ch13: RQ 6,9 P 4,9 Ch14: RQ 4,11 P 2
3/30	17	Ch 13 Galaxies	
4/1	18	Ch 14 Cosmology	
4/6	19	Ch 15 Origin of the Solar System	8. Ch15: RQ 2,6,19 P 4 LL 2 Ch16: RQ 13 P 3 Ch17: RQ 4,9 LL 2
4/8	20	Ch 16 The Earth and Moon	
4/13	21	Ch 17 Mercury, Venus, and Mars	
4/15		<b>Exam 3</b>	
4/20	22	Ch 18 The Outer Solar System	9. Ch18: RQ 5,12,14 P 9 Ch19: RQ 4,12 P 1 Ch20: RQ 7,11 LL 2
4/22	23	Ch 19 Meteorites, Asteroids, and Comets	
4/27	24	Ch 20 Astrobiology	
4/29	25	Final Review	
<b>5/4</b>		<b>Final Exam – (1:00 pm to 3:00 pm)</b>	
<b>5/6</b>		<b>Finals Week – No Class</b>	

## Course Objectives:

The following course objectives support the university competency of Critical Thinking:

Students will demonstrate their ability to employ the methods of science for inquiry. Students will show the ability to formulate rational approaches to problem-solving both as conceptual situations (HOMEWORK PROBLEMS) and in hands-on experiments (DESIGN OF LABORATORY EXPERIMENTS). Students will be successful, working on homework assignments and discovery-based lab exercises.

Students will demonstrate an acceptable level of skill in using the tools of science. Students will show the proper use of laboratory equipment, though supervised lab experience. Students will be able to explain the principles involved in the lab experiments and show their application through appropriate data collection and analysis. (LABORATORY REPORTS) Students will be able to use the mathematical and logical tools of science as evidenced through their success on in-class and homework assignments. (HOMEWORK PROBLEMS)

Students will demonstrate an acceptable level of understanding of the major principles of a scientific discipline. Students will show this ability through their success on the EXAM QUESTIONS that pertain to the major principles of the field.

The following course objective supports the university competency of written communication:

Students will demonstrate the ability to formally communicate scientific findings and interpretations, both in writing and speaking, using formats appropriate to the audience and the discipline. Students will demonstrate their ability to present their work formally through writing and revision of the LABORATORY REPORTS.

### PHYS 1410 Learning Outcomes

Upon successful completion of this course students will be able to:		
Departmental program goal	Course Student Learning Outcome	Methods of Assessment
- to enable non-science majors to understand the proper roles of science, technology, and mathematics within our society	Students will demonstrate their ability to employ the methods of science for inquiry.	Students will show the ability to formulate rational approaches to problem-solving both as conceptual situations (Homework Problems) and in hands-on experiments (Design of Laboratory Experiments). Students will be successful, working on discovery-based classroom assignments and discovery-based lab exercises.
- to enable non-science majors to understand the proper roles of science, technology, and mathematics within our society	Students will demonstrate an acceptable level of skill in using the tools of science.	Students will show the proper use of laboratory equipment, though supervised lab experience. Students will be able to use the mathematical and logical tools of science as it can be seen through their success on in-class and homework assignments. (Homework Problems)
- to enable non-science majors to understand the proper roles of science, technology, and mathematics within our society	Students will demonstrate an acceptable level of understanding of the major principles of a scientific discipline.	Students will show this ability through their success on the exams questions that pertain to the major principles of the field.
- to enable non-science majors to understand the proper roles of science, technology, and mathematics within our society	Students will demonstrate the ability to formally communicate scientific findings and interpretations, both in writing and speaking, using formats appropriate to the audience and the discipline.	Students will demonstrate their ability to present their work formally through writing and revision of the laboratory reports.