

PH1600 – Introduction to Astronomy

Fall Semester 2011 – Section 0B (ONLINE)
Lectures posted Tuesday and Thursdays, approximately Noon

Instructor: Mike Meyer (mrmeyer@mtu.edu)

Office. Hrs. 10:30-11:30 MWF, or by appointment, Fisher 221, (906) 487-2273

TEXTBOOK

"Discovering the Essential Universe", 4th ed, by Neil F Comins. A few additional readings will be required as noted in the calendar; these will be provided by the instructor.

CLASS ROUTINE

The following routine outlines the work before/during/after each typical class session:

- 1) Read the sections indicated in the calendar well before class time.
- 2) Complete the pre-lecture reading quiz in BlackBoard (Due by 9:00 AM on the day of class.)
- 3) Watch first lecture topic (10-15 minute video, for example lecture 1A)
- 4) Print and complete the in-class assignment (found under "assignments" in BlackBoard).
- 5) Watch the 2nd lecture topic (10-15 minute video, for example lecture 1B)
- 6) Start or complete homework for that week. (1 homework for every 2 lectures—see calendar)

PRELECTURE READING QUIZ (Total 135 points possible, treated like 120.)

A 5 point pre-lecture reading quiz is due at 9:00 on every day we have class except the day of the midterm exam. The quiz will consist of 3-5 questions from the expected reading including at least one essay-type question. You may miss a total of 15 pre-lecture points for the semester without penalty.

VIDEOS and IN-CLASS ACTIVITIES (Total 135 points possible, treated like 120.)

Class videos will be posted by approximately noon on Tuesdays and Thursdays. Splitting the two parts of each lecture, an "in-class assignment" found under the assignments tab in BlackBoard should be completed. You may do this assignment on your own or with a group of friends, and/or you may use the discussion board to complete it. For most of the activities, you will probably need to print the attached worksheet, complete it, and then scan/photograph it to submit as an attachment. You may also complete the document in Word and resubmit in online. These assignments are due by 11:59 PM the next day (Wednesday or Friday). Correctly completing and submitting each in-class activity is worth a total of 5 points. Again, you may miss 15 in-class points without penalty.

HOMEWORK (Total, 180 points)

One 15 point homework quiz will be due approximately every week. (Exceptions are made for the midterm exam. See the calendar below.)

Deadlines for homework, in-class, and pre-lecture activities are firm unless I receive notification **in advance about circumstances beyond your control that will cause you to miss a deadline, or an excuse from the Dean of Students' office.**

CONTEMPORARY ASTRONOMY PRESENTATION (30 points):

All students will be required to create a written online presentation on a contemporary astronomy topic of her/his choice. The presentation should be presented in a format easily accessible to all of your classmates (PPT, PDF, HTML, etc.); you may post the material on a site of your choosing or forward a single link or document to me for posting. Your presentation should take your classmates 3-5 minutes to view, should highlight a current (within the last 2 years) area of study, discovery, or event in astronomy, and include at least 2 pictures, animations or videos, and be thoroughly cited with at least 3 links to websites or articles that you used as sources and would serve as further reading for the class's benefit. The goal is to see a broad cross-section of the types of work being done in the field of astronomy. Presentations will be due in 3 groups drawn randomly. Evaluation by your classmates will determine part of your grade. More details will be forthcoming.

EXAMS

A midterm exam (60 points) will be given on Tuesday, October 19. A comprehensive final exam (90 points) will be given during finals week (Dec. 13-17) as scheduled for this course by the registrar's office. If you are on/near campus, you may make arrangements with me to proctor your exam. If not, you will need to find a different proctor according to the university rules posted at:

http://www.techonline.mtu.edu/student_services/proctor.htm

If you intend to find an off-campus proctor, I will need the proctor form returned to me no later than October 1 so that I have time to set up your exam with your proctor. Both exams will be open-book and open-note, but students will be expected to work independently. (No e-mail, texting, cell-phones, internet, etc.) **Please do not make travel arrangements that conflict with these exam times. Exams will not be given at alternate times without an excuse from the dean of students, faculty advisor, or coach.**

GRADING

A total of 600 points is then possible for the semester. Grades will be determined using the following scale of total points earned:

A: 540 or above; AB: 510-540; B: 480-510; BC: 450-480; C: 420-450; CD: 390-420; D: 360-390; F: Below 360

ADA STATEMENT: Michigan Technological University complies with all federal and state laws and regulations regarding discrimination, including the Americans with Disabilities Act of 1990. If you have a disability and need a reasonable accommodation for equal access to education or services at Michigan Tech, please call the Dean of Students Office, at [487-2212](tel:487-2212). For other concerns about discrimination, you **may** contact your advisor, Chair/Dean of your academic unit or the Affirmative Programs Office, at [487-3310](tel:487-3310).

CALENDAR/TOPICS

The calendar below outlines work for the full term. Homework due on Monday will become available after the first class with material on that homework (generally the Tuesday before).

Date	Reading	Lecture A Topic (10 min)	Calculation (15 min)	Lecture B Topic (10 min)	Current Topics presentations	Homework Due
8/30	Syllabus, Appendix A, Section 1-1 and 1-2	Course policies and procedures	Metric prefixes and sci notation	The scale of astronomical objects, what is astronomy?	Explanation of process, scheduling	Homework #1 Due 9/5 NOON
9/1	1-3 to 1-7	Celestial coordinates and star motion	Coordinate exercises	Calendars and Seasons	Questions and schedule finalization	
9/6	1-6 to 1-12	Phases	Phases of the moon exercise	Eclipses		Homework #2 Due 9/12 NOON
9/8	2-1 to 2-5	Solar system history	Kepler's Laws	Kepler's Laws		
9/13	2-5 to 2-12	Newton's Laws	Newton's Universal Law of gravitation and Angular Momentum	Planet formation, Angular Momentum		Homework #3 Due 9/19 NOON
9/15	2-13 to 2-14 AND 3-1 to 3-4	Exoplanet detection	Wavelengths and frequencies	Electromagnetic spectrum		
9/20	3-5 to 3-10	Types of Telescopes	Ray diagrams and magnification	Magnification		Homework #4 Due 9/26 NOON
9/22	3-11 to 3-16	Diffraction/Resolution	Diffraction and Angular resolution	Non-Optical astronomy		

9/27	3-17 to 3-22	BlackBody Radiation	Wein's Law	Emission and Absorption spectra		Homework #5 Due 10/3 NOON
9/29	3-21 to 3-24	Bohr Model	Bohr Model	Doppler Effect Shifts		
10/4	4-1 to 4-10	Earth – tides, atmosphere, and magnetic fields	Doppler shift, period and frequency	The Moon - structure and formation	Group 1 Presentations Due	Homework #6 Due 10/10 NOON
10/6	5-1 to 5-15	Mercury and Venus	The challenges of planetary travel	Mars		
10/11	5-16 to 5-31	Jupiter and Saturn	Gravity within Saturn's rings	Neptune and Uranus	Group 1 Reviews Due	Midterm review Due 10/17 NOON
10/13	6-1 to 6-14	Pluto and minor planets	Gravity near smaller objects	Comets, Asteroids, and Meteorites		
10/18	**** MIDTERM EXAM – IN CLASS ****					
10/20	7-3 to 7-3	Exam Return and Review	Mid term evaluation	Solar Structure		Homework #7 Due 10/31 NOON
10/25	7-4 to 7-10 AND 8-1-8-3	Sunspots and other solar activity	Mass from Energy Proton-Proton chain, mass defect	Parallax, absolute and apparent magnitude	Group 2 presentations Due	
10/27	8-4-8-9	Star age and classification	Star Power (Luminosity)	Inverse square laws and power		
11/1	8-10-8-13 AND 9-9-1 to 9-4	Radial motion and binary stars	Mass from luminosity	Birth and evolution of stars	Group 2 Reviews Due	Homework #8 Due 11/7 NOON
11/3	9-5 to 9-16	Brown Dwarfs and Neutrinos	H-R evolution exercise	Variables stars and clusters		

11/8	10-1 to 10-17	Death of lightweight stars		Supernovae and pulsars	Group 3 presentations Due	Homework #9 Due 11/14 Noon
11/10	10-18 to 10-29	Black Holes	Schwarzschild Radius	Relativistic difficulties: Gamma Ray bursts, time dilation, etc.		
11/15	11-1 to 11-7	Milky Way Galaxy	Scale of Galaxy orbital calculations	Dark Matter	Group 3 reviews due	Homework #10 Due 11/28
11/17	11-8 to 11-18	Types of galaxies	Gravitational lensing exercise	Large Scale Structure		NOON
11/29	11-19 to 11-28	The expanding universe	Hubble's Law	Active Galactic Nuclei		Homework #11 Due 12/5
12/1	12-1 to 12-12	Microwave Background and the Big Bang	Fundamental forces and Big bang times	Grand unified theories and cosmological ideas		NOON
12/8	12-13 to 12-16	Fate of the universe and dark energy	Shape of the universe exercise	Superstring and other theories		Homework #12 Due 12/12 NOON
12/8	13-1 to 13-7	Life in the universe?	The Drake Equation	Suitable stars and SETI		
*** FINAL EXAM – Between 12/12 and 12/16 per final exam schedule						