

ASTRONOMY 133

Introductory Astronomy Laboratory

ONLINE

Fall 2007

You may begin anytime now!

See below for details

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Course Description

1 Credit Hour

Prerequisite: Completion of or concurrent enrollment in ASTR 131.

Emphasizes experimental work with the scientific concepts important in astronomy, including computer simulations of astronomical events.

This course if combined with ASTR 131 provides the student with a four-hour laboratory science credit.

Course Objectives

To provide a laboratory experience in astronomy by the discovery of astronomical concepts through the collection and analysis of simulated astronomical data.

ASTRONOMY 133-ONLINE

GENERAL INSTRUCTIONS

1. Your first step is to make sure you have the necessary course materials.
They are:

Access to the [ASTRONOMY PLACE](#) website

First click [here](#) to go to the website. Once there, click on the picture of the textbook on the right titled “Essential Cosmic Perspective – 3rd edition”. To purchase access, select the “Buy Now” icon and follow the instructions. Once you have access, you will need to login as an established user.

AND

You need to purchase the lab manual –

ASTRONOMY MEDIA WORKBOOK FOR COSMIC PERSPECTIVE - 5th Ed.
(by Michael C. LoPresto)

The Lab Manual is available at the college store ([link](#)). Note: you will not be able to purchase access to the Astronomy Place website at the bookstore. Access to the website is only available at the [ASTRONOMY PLACE](#) website.

2. Go to [ASTRONOMY PLACE](#) to begin work.

The class is based on the **TUTORIALS**, so you will need to access the tutorials and work through them. **To access the Tutorials, sign in to [Astronomy Place](#) as described above, then look for and select the “Tutorials” link found to the left of the webpage, about half way down the list.** NOTE: The when working through the online tutorials, refer to them by their **titles**. The tutorial numbers listed below refer to the chapter numbers in your Astronomy Media Workbook where the titles are the same as on the website.

The worksheets for each TUTORIAL are included in your lab manual

THESE ARE WHAT YOU HAND IN!

3. The following **TUTORIALS** must be handed in to me by 5:00 pm on the following **DUE DATES** listed below. **Late assignments will be accepted up to one week after the due date, but a 50% penalty will be assessed.**

Note: the last day that anything will be accepted is
Monday December 10th.
No exceptions.

TUTORIAL #1-SCALE OF THE UNIVERSE - due September 4

Note that TUTORIALS #2 and 3 are NOT assigned

TUTORIAL #4-PHASES OF THE MOON - due September 10

Note that TUTORIAL #5, 6 and 7 are NOT assigned

TUTORIAL #8-LIGHT & SPECTROSCOPY - due September 17

TUTORIAL #9-DOPPLER EFFECT- due September 24

Note that TUTORIAL #10 is NOT assigned

TUTORIAL #11-FORMATION OF THE SOLAR SYSTEM - due October 1

TUTORIAL #12-SHAPING PLANETARY SURFACES - due October 8

TUTORIAL #13-SURFACE TEMPS OF TERRESTRIAL PLANETS - due October

15

TUTORIAL #14-DETECTING EXTRA-SOLAR PLANETS - due October 22

Note that TUTORIAL #15 and 16 are NOT assigned

TUTORIAL #17-THE HERTZSPRUNG-RUSSEL DIAGRAM - due October 29

TUTORIAL #18-STELLAR EVOLUTION - due November 5

TUTORIAL #19-BLACK HOLES - due November 12

TUTORIAL #20-DETECTING DARK MATTER IN SPIRAL GALAXIES - due
November 19

Nothing Due on Monday November 26 - Happy Thanksgiving

TUTORIAL #21-HUBBLE'S LAW - due December 3

TUTORIAL#22-FATE OF THE UNIVERSE - due December 10

TUTORIALS may be handed in one of THREE WAYS:

- 1- Put in my science division mailbox in room **S-108** (SCIENCE BUILDING)
- 2- Placed in the box hung on the wall next to my office door **S-17** (SCIENCE BUILDING)
- 3- If you cannot come on campus, you may **US MAIL** them to me at:

Steven R. Murrell, Science
Henry Ford Community College
5101 Evergreen RD
Dearborn, MI 48128-1495

**Each TUTORIAL is worth 20 points,
12 for the lesson questions and
8 for the lab activity.**

Your grade will be based on 270 points, 243-A, 216-B, 189-C, 162-D, <162 E

Graded labs may be picked up from the box hanging outside my office
door,

room S-17 (basement of the Science Building)

To track your progress in the course use the 'Grades/Progress' link on the left margin of the UCompass Website for this course

IF YOU NEED HELP!

Email me at srmurrell@henryford.ucompass.com

we can communicate via email

or you may set up an appointment to meet me in my office.

Some Words to the Wise

Online classes are NOT for everyone, so please keep the following in mind:

- 1- Yes, you have more flexibility,
- 2- but the trade off is that you must work independently and
- 3- FOLLOW DIRECTIONS!

HINTS FOR THE LAB ACTIVITIES

TUTORIAL #1-Lab Activity; $speed = distance/time$, so $time = distance/speed$

USE THE TOOL -it relates speed distance and time, if you enter two of them the tool will give you the third!

TUTORIAL#8-LabActivity; Adjust the temperature to vary the spectrum...HINTS

1-think about what a mixture of all visible colors gives you 2-if you want a maximum temperature that is NOT visible, do you need to look at wavelength longer or shorter than those of visible light?, 3-looking at the shape of the curve, is the peak of something that looks blue at a longer or shorter wavelength than blue light?

TUTORIAL#9-LabActivity; vary the speed of the helicopter and observe the wavelengths, the range of the different colors are given on the table.

TUTORIAL#11-LabActivity;-Thinks about what the Kelvin Temperature of the frost line should be and which types of planets this would affect, the same for the rock/metal line.

TUTORIAL#12-LabActivity-THIS ONE IS REALLY COOL! The key is to pick the right *Temperature* and *Size* for each object. Earth is LARGE, so think about what

each other object would be compared to that, small medium or large. Earth has a MEDIUM temperature, so think about who is closer or farther from the Sun. If you make good picks your results should be reasonable.

TUTORIAL#13-LabActivity;-THIS ONE IS COOL TOO!-The tool can do all the work for you, if you set it right, your answers should be reasonable. Think about what you know about surface conditions of each of the planets, if it doesn't come out accurate, try again!

TUTORIAL#14-LabActivity;-Use the tool to vary mass or radius while keeping the other constant and see how it affects the period and amplitude of the graph. Think about how period and amplitude of the graph would be affected by changes in the period and mass of the planet.

TUTORIAL#17-LabActivity;-Just put the cursor on a star and the tool will give you a *Luminosity* and *Temperature*. *Star Types* are in terms of color and size, i.e. *red-giant*, *white-dwarf* etc.

TUTORIAL#18-LabActivity;-Use the tool to set *mass* and click begin. Then record the *elapsed time (lifetime)* and *Luminosity* given. Plot the exponents from your data on the graphs on the next page to determine relationships between *mass* and the *lifetime* of a star and *mass* and *Luminosity*. You may find one of the graphs surprising!

TUTORIAL#19-LabActivity;-R/M should be fairly constant.

TUTORIAL#20-LabActivity;-A merry go-round is a solid, the solar system obeys Kepler's Laws, the Galaxy has much unseen matter.

TUTORIAL#21-LabActivity;-When given a distance, follow a straight line from that value on the *Distance from Earth* axis to the graphed line, and then another straight line from that line to the *Recessional Velocity* axis to determine the velocity of the galaxy. Do the opposite to determine a distance when give a velocity. Divide your Hubble Constant into 1000 to estimate the age of the universe in Billions of Years!

TUTORIAL#22-LabActivity;-The tool can do it all for you here. Set the *Mass Density* and *Strength of Dark Energy* to desired values. The *Age of Universe* will come from how much time has passed on the graph before "Now" and the *Fate* depends on the slope of the line. If the slope increases the universe is *Open*, if it becomes constant (a straight line) the universe is *Flat*. The universe is *Closed* if the slope decreases.

GENERAL ACADEMIC POLICIES

Make-ups- If a deadline is missed a student may seek the permission of the instructor to submit a tutorial . If permission is granted, the tutorial will be accepted without penalty.

Drop-policy-Any student may drop a course for any reason on or before the college drop deadline. Generally, the instructor will follow the college drop deadline. After the deadline the instructor may, at his discretion, record a DR grade on a student's grade report. A student who wishes to explore this option must discuss their situation with the instructor.

Academic Dishonesty- This will absolutely not be tolerated under any circumstances. The definitions of and penalties for academic dishonesty are taken from the *College Organization Handbook* (see below).

POLICY ON ACADEMIC DISHONESTY (CHEATING)

Henry Ford Community College considers academic dishonesty to be a serious offense.

It shall be the policy of the College that determination of the fact of academic dishonesty and appropriate action with respect to academic dishonesty by a student shall be a matter of individual judgment by the instructor. The instructor may administer a penalty up to and including failure in the particular course. It is the professional obligation of the faculty to enforce academic integrity in their courses.

Academic dishonesty is any activity intended to improve a student's grade fraudulently.* It includes, but is not limited to, the following:

- A. Unauthorized acquisition of tests or alteration of grades;
- B. Unauthorized use of notes, books, or other prohibited materials during an examination;
- C. Open cheating during an examination;
- D. Permitting another person to take a test in the student's place or receiving unauthorized assistance with any work for which academic credit is received;
- E. Providing unauthorized assistance with any work for which academic credit is received;
- F. Revision of graded work in an attempt to receive additional credit fraudulently;
- G. Plagiarism or using another person's work without acknowledgment;
- H. Any other conduct intended to obtain academic credit fraudulently or dishonestly.

If an instructor fails a student in a course for academic dishonesty, the instructor will immediately notify, in writing, the division/department head, the student, and the Registrar of the infraction, retaining copies of all notifications. The Registrar will maintain a record of all such violations. If a student fails two classes as a result of academic dishonesty, he or she will be dismissed from the College for two academic years. In addition, a notation of the reason for academic dismissal will be placed on the student's transcript. The notation may be expunged at the discretion of the appropriate Vice President/Dean if a student petitions for its removal after at least a two-year period has elapsed since the disciplinary action.

If a student believes that the accusation of academic dishonesty is false, he or she may appeal through the Student Complaint Policies and Procedures. If the appeal reaches the Student Complaint Board, the Board will only consider whether the charge of academic dishonesty is justified and will not set aside or change the penalty given by the instructor unless the charge of academic dishonesty is set aside.

* Any action that violates the Student Conduct Policy: Due Process Procedure will also be subject to review under that policy.

SAMPLE