

## **Astronomy 110: The Visible Universe Spring 2007**

**Sections 2088 (t th 11 am), 2090 (t th 12:30pm), 0970 (t th 2 pm)**

**Instructor:** Karen Castle

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**email** [kcastle@dvc.edu](mailto:kcastle@dvc.edu) or inside WebCT

**Websites:** <http://members.frys.com/~kqc/> for workbook (no password needed)

<http://webct.dvc.edu/webct/public/home.pl> for practice tests, quizzes, email

**Astronomy 110** covers fundamental astronomical concepts and observations; selected mathematical and logical techniques for developing an understanding of celestial motions and measurements; the significance of astronomy to humanity. The planetarium sky will be used to for demonstration.

**Recommended Prerequisites:** Math 110, one year of high school algebra or equivalent is recommended. It is recommended that the student be eligible for English 122. The material from Math 110 will be used during the course of the class.

Astronomy 110 is a 3 unit letter grade only course.

### **Objectives:**

1. Develop familiarity and appreciation of the sky and the phenomena observed.
2. Gain recognition of the stars, star groupings, planets, and other night sky objects, be able to find objects in the night sky.
3. Become aware of the historical development of astronomy
4. Develop an appreciation of the way science develops a correspondence between observations and one or more explanations
5. Gain familiarity with the constituents of the universe and our evolving state of knowledge and understanding
6. Develop confidence in reading and dealing with graphs and other numerical material.

### **Textbooks/ Materials:**

**Pathways to Astronomy**, Stephen E. Schneider, Thomas T. Arny, McGraw Hill, 2007, **required**.

**Astronomy 110 Visible Universe Fall 2006 ed Castle Class Notes**, **required**

Note taking materials, pencil and Scantron # 2052 for tests, scientific calculator (any model) **required**. We will be using the text, calculator and handouts during class. Please bring them to class.

### **Evening Observing:**

Students wishing to participate in evening observing sessions are encouraged to do so. Observing sessions are scheduled for

Friday, Feb 2, 2007 starting 7 PM

Friday, Feb 23, 2007 starting 7 PM weather permitting

All students and your well-behaved friends are invited. Dress casually, in layers for OUTDOOR weather.

### **Office Hours:**

Some of these hours are in my office, others are cell phone availability. Don't hesitate to phone. Please leave voice mail, not text messages, on the phone.

Office 925-685-1230x2832 cell 925-209-6317 if you have questions or concerns.

I am usually available in the evenings.

**Monday** 12:30- 2 PM, SC 313 925-685-1230 ext 2832,

**Tuesday** 3:30- 5 PM SC 313 Phone (925) 685-1230 extension 2832

**Wednesday** By Phone and internet 7PM- 9PM at 925-209-6317

**Thursday** 9:30 AM-10:45 AM SC 313 Phone (925) 685-1230 extension 2832

**Friday** by appointment, call at 925-209-6317 to set up

**Weekends and Nights** - phone or by appointment 925-209-6317 (don't hesitate to call!)

Or email ANY time. Inside WebCT is best. Email outside WebCT [kcastle@dvc.edu](mailto:kcastle@dvc.edu)

**Do feel free to come or phone for help. It IS acceptable to ask to have work checked before the day it is due. I will check it and return it so it can be corrected.**

## **Astronomy Tutoring – SC 701 – Hours To Be Announced**

Students are encouraged to come to the astronomy tutoring. Tutors benefit most students, even ones who can succeed without assistance. They provide help, camaraderie, a structured environment, and useful feedback. Astronomy tutoring is FREE of charge. Just drop in. Hours will be posted in SC 601

### **Honesty**

All students are required and expected to comply with the Diablo Valley College Student Code of Conduct (available in the DVC catalog). Where cheating is suspected, the instructor may assign a zero on the assignment, may require that the student make up the same, or another (possibly more demanding) assignment to demonstrate competence and understanding of the material, or may refer the student to the Dean of Student Life for further action.

**Tests and quizzes are to be done by one person only. Homework may be done in collaboration, but simply copying answers from another is unacceptable. If you are asked to write a paragraph or an essay, it is NOT acceptable to copy the text from a text book or the internet.**

### **Grading:**

Grades will be assigned based on the number of points accumulated. Exams, classwork, quizzes, and homework will be included. There will be at least 217 points possible. Grades will be assigned based on:

170 points and up	A
140 - 169 points	B
113-139 points	C
90-112 points	D
<90 points	F

### **Grade Reporting**

DVC assigns letter grades at the end of the semester only. I will pass around a grade sheet whenever an assignment is returned, so that you can see how you are doing and can check that your grades have been recorded properly.

**Exams and Quizzes:** There will be **three exams** (including the final), and **three quizzes**. Each exam is worth 50 points. Each quiz is worth 7 points. The final will cover material from the last portion of the course only. Material from the text, class, notes and from additional handouts will be included.

Exams and quizzes are to be taken on the date scheduled. There will be no make up exams unless arrangements have been made ahead of time. Quizzes will not be available for make up. If a student has a commitment for the day of a quiz or exam, and makes arrangements well ahead of time, it will be possible to take the quiz or exam early.

**Personal Response System:** DVC has electronic response units that can allow you to answer in class questions. We have only one class set. It is your responsibility to take the proper unit, use it without damaging it, and return it to its proper place in the box. If your unit is not working, alert the instructor immediately for.

**Class work and homework will be stressed on the exams and homework. Students should expect to maintain near perfect attendance in order to achieve a good grade.**

Exams require Scantron form 2052 or equivalent. Quizzes do not require forms. Calculators are permitted and may be necessary. Scratch paper will be provided.

**Exam Dates:** The test and quiz dates planned are identified on the schedule. The material to be covered will be announced in class. Quizzes require 15-20 minutes. Tests require approximately 50 minutes. The examinations (including the final) are NOT cumulative. Each includes material since the previous exam.

You **MAY** attend a different section of this course with the same instructor. It is not necessary to ask permission. **Class times are TTh 11AM-12:15PM, 12:30 PM-1:45 PM Tests and quizzes will be given at the end of class.**

## Class Exercises and Homework

Homework will be assigned regularly (approximately six each semester). Most exercises are worth seven points. Homework questions and problems will often be repeated on tests or quizzes. Class exercises will be unannounced. They will be worth varying numbers of points. They cannot be made up.

## Attendance/Withdrawal:

College regulations allow the instructor to drop any student who has absences exceeding the equivalent of two weeks of class for a full semester class. This amounts to 1/9 of the class meetings. For full semester classes this is six class meetings of a class which meets MWF, four classes of a TTh class, two meetings of a once per week class. One ninth of a six week summer class is three class days. Students who exceed this number of absences may be dropped at the discretion of the instructor. Withdrawal (if desired) is not automatic, it must be initiated by the student. Attendance will be taken.

If a student is absent from class, it is the **student's responsibility** to get handouts and notes **before** the next class, and to learn about any upcoming tests and assignments.

**Late Papers:** Late papers may be accepted for substantially reduced credit. Papers turned after they are collected in class are **LATE**. Papers will **NOT** be accepted after the answers have been discussed in class. This may occur at the meeting when the papers are due or at the next meeting.

**Your personal absence does not alter the due date.**

If you are not in class when work is due, papers should be **MAILED** or **emailed** by the time they are due. The postmark determines whether the paper is on time (address K.G. Castle, Diablo Valley College, 321 Golf Club Drive, Pleasant Hill Ca. 94523). Papers that arrive after the end of classes **WILL NOT** be accepted.

**Illness/Accidents:** If you are in a serious accident or are so ill that you are in the hospital, please PHONE or get someone to phone for you as soon as possible.

**Outline and Reading:** The material should be read **before** coming to class. Typically, we will work on the topic of the text material following the date on the syllabus. Work may include discussion, demonstration, class exercises, additional information and quizzes. There will always be an opportunity to request assistance on the material prior to being tested.

Dates	References P- Pathways Units C Castle- workbook	Learning Goals
Jan16-18	P 1, 2, 3 C Ch 1	Overview of basic Components of the Universe Converting units, Using logarithmic plots
Jan 23-25	P 5, 7, 13.1 C Ch 2,3	<b>COORDINATE SYSTEMS</b> Understand coordinate systems; Latitude and Longitude, Right Ascension, Declination, Altitude and Azimuth, why things rise and set Begin constellation identification and star map study.
Jan 30- Feb 1	C Ch 3 P 5.4, 5.5	<b>LATITUDE AND VISIBILITY OF THE SKY</b> Appreciate the meaning of circumpolar constellations and learn to compute what bodies are visible, which are circumpolar and which are never seen.
Feb 6-8 Feb 9-10 holiday	P 7, 13.2 C Ch 4	<b>SOLAR/SIDEREAL TIME AND DATE</b> Understand the difference between Solar and Sidereal Time. Given two from among: day of the year, solar time, and sidereal time, find the third
Feb 13-15 <b>Quiz 1</b> <b>2/15</b> Holiday Feb 18-19	P 6,7, 9 C Ch 5	<b>MOTION OF THE SUN, SEASONS</b> Understand changing azimuth of Sunrise and Sunset Understand how the tilt of the Earth's axis results in seasons Find the coordinates of the Sun given the date. Learn how precession changes the direction of the Earth's North Pole, the zodiac signs, and the celestial coordinates of stars.
Feb 20-22	P 8 C Ch 5	<b>MOTIONS OF THE MOON</b> Relate the Moon's position to its phase and the time of day it is visible. Understand eclipse geometry and frequency.

Feb 27- Mar 1 <b>Test 1 3/1</b>	P 11 C Ch 6 Planetarium demo	<b>MOTIONS OF PLANETS ETC.</b> Inventory the motions of stars, Sun, moon, planets and their causes. Find out how retrograde motion works in our current understanding
Mar 6-8	C Ch 6	<b>ARCHEOASTRONOMY</b> Identify astronomical alignments at sites such as the Sun Dagger, the Egyptian Pyramids. Learn what the Babylonian astronomers observed and predicted.
Mar 13-15	P 10, 11,13 C Ch 6 Magnitudes P 54.4 Parallax P 52	<b>GREEK MODELS</b> Understand the major features of each model and how they predict the appearance of the sky. Know the purpose of the Pimum Mobile, the deferent, the epicycle, and the equant. Understand how parallax works and its importance to astronomy. Learn when and how the Greeks found the size of the Earth and Moon and the distances to the Sun and Moon. Understand how the magnitude system works.
Mar 20-22	P 12 C Ch 6	<b>RENAISSANCE ASTRONOMY</b> Follow the development of Copernicus', Brahe's and Kepler's models. Know how each model explains the apparent motion of the Sun, stars, planets, and the Moon. Evaluate the evidence for and against heliocentric models. Learn which features define an ellipse so that you can distinguish correctly drawn ellipses from incorrect ones. Understand Kepler's laws. Compute the sidereal period of a body orbiting the Sun given the semimajor axis of the orbit or vice versa.
Mar 27-29 <b>Quiz 2 3/29</b> <b>Holiday 3/30-4/8</b>	P 14, 15, 16, 17 conceptually, 18, 19, 20 C Ch 7	<b>GRAVITY AND LAWS OF MOTION</b> Learn the meaning of Newton's laws and of conserved quantities and their significance. Understand how gravity works, how it decreases with distance. Compute weight, circular and escape velocity. Know what defines a black hole.
Apr 10	P 4.1, 4.2, 21, 22, 23, 30.1 C Ch 8	<b>LIGHT</b> Understand the wave nature of light. Understand that different wavelengths of light are given different names and carry different amounts of energy. Some of these wavelengths do not go through Earth's atmosphere. Understand the way that light spreads out as it leaves a source.
	P 24	<b>ATOMIC STRUCTURE AND SPECTRA</b> Understand how energy levels in atoms allow us to determine temperature and composition of distant bodies. Distinguish among continuous, absorption, and emission spectra; their causes and what information can be found. Class demonstration
		<b>MEANING OF TEMPERATURE</b> Understand that temperature determines the distribution of speeds of atoms and molecules. Appreciate the way that the light from a black body results from the temperature of a body.
	P 25	<b>DOPPLER EFFECT</b> Understand the effect of relative motion on the wavelength of light. Use the Doppler Effect to find the relative speed of a source of light or to find the wavelength of light you will receive.
Apr 12 <b>Test 2</b>	P 32, 33, 34 Skim 42 See 61.1 for modeling interiors C Ch 9	<b>SOLAR SYSTEM OVERVIEW AND FORMATION</b> Features of Jovian vs Terrestrial planets. Learn how the formation of the Solar System relates to the types of planets and how we use models to approximate the interiors of planets and stars. Learn about the variety of extrasolar planets and how they are discovered.
Apr 17-19	P 35, 36, 48 C Ch 10	<b>EARTH</b> Learn about the theory of plate tectonics; its cause and the evidence for it. Learn about basic landforms e.g. river valleys, glacier valleys, volcanoes, mountains in class. Find out about our unique atmosphere and how it has changed from its earlier state. Understand how the Greenhouse effect and life on Earth change the environment and atmosphere. Appreciate the how ozone layer interacts with solar radiation. Understand how the Earth's magnetic field affects the atmosphere and the aurora.

		<b>RADIOACTIVE DECAY</b> Understand how radioactive atoms transform to other atoms allowing the age of a sample to be found.
Apr 24-26	P 37	<b>MOON</b> Know what features are found on the Moon and how it compares with those on the Earth and other terrestrial bodies Understand the Moon's history is reflected in its landforms
	P 19	<b>TIDES</b> Understand how the law of gravity causes more force on the closer parts of an object. Learn how the tides on Earth vary over the day and month, and how they affect the Moon's orbit.
	P 38, 39	<b>MERCURY AND VENUS</b> Learn about how the planet's features reflect its history.
May 1-3 <b>Quiz 3</b> <b>May 3</b>	P 40	<b>MARS</b> Learn about Mars' surface features and our exploration of Mars. Compare the landforms on Mars with those on the Earth and Venus. Understand the evidence for water on Mars. Find out origins of Phobos and Deimos.
	P 43, 45 (Moons)	<b>JUPITER AND SATURN</b> Get an overall picture of the structure of Jovian planets, their magnetic fields, winds, and cores. Find out about the Galilean satellites, Titan and the small icy moons of Saturn. Find out the origin of rings.
May 8-10	P 44, 46	<b>URANUS, NEPTUNE, PLUTO</b> Understand the structure of Jovian planets and how Pluto differs. Compare and contrast Moons and their internal activity.
	P 49, 50, 51	<b>SUN</b> Understand the source of the Sun's energy. Learn the features of the solar cycle and how they relate to the Sun's magnetic field.
	P 41, 47	<b>ASTEROIDS, COMETS, METEORS</b> Understand what we can learn from comets, asteroids, and meteorites. Appreciate what the composition of the meteorites tells us about their histories. Know where comets spend most of their lives and how they form tails
May 15-17	P 58, 59	<b>STARS AND THE HR DIAGRAM</b> Understand how the Hertzsprung Russell diagram separates stars by time of life and by mass.
		<b>LIVES OF THE STARS</b> Learn the basic life stages of stars. Understand the evidence for each stage and its basic features
	P 70, 74, 75	<b>GALAXIES AND THEIR GROUPS</b> Recognize the various types of galaxy. Learn about how galaxies cluster and interact.
	P 80, 82	<b>COSMOLOGY</b> Understand the expansion of the Universe. Appreciate the evidence for the Big Bang and for the future of the Universe.

**Final Exam Times:** You may come to either of these as far as I am concerned, but check to be certain there is no conflict with another teacher.

PLEASE NOTE, Exam Times are NOT IDENTICAL to class time.  
 Section 2088 (t th 11:00 am) Thurs May 24, 10:30 AM SC 601  
 Section 2090 (t th 12:30 pm) Tues May 22, 10:30AM SC 601  
 Section 0970 (t th 2:00 pm) Tues May 22, 1:00 PM SC 601  
 Exams start AT the times listed



