CREDIT COURSE OUTLINE

I. COVER PAGE

(1) ASTRO 10	(2) Introduction to Astronomy	(3) 4
Number	Title	Units

(4)	Lecture / Lab Hours:			
	Course Hours			
		Weekly Lec hours:		3.00
		Weekly Lab hours:		2.00
		Total Contact hours:		90.00
	Lec will generate 0 hour(s) outside work.			
	Lab will generate 0 hour(s) outside work.			
(5)	Grading Basis:	Grading Scale Only		
		Pass/No Pass option		X
		Pass/No Pass only		
(6)	Advisories: Eligibility for Math 101 Eligibility for English 125 or 126			
(7)	Pre-requisites(requires C grade or better):			
	Corequisites:			

(8)Classification:		
	Degree applicable:	X
	Non-degree applicable:	
	Basic skills:	
(9)RC	Fulfills AS/AA degree requirement: (area)	
	General education category:	
	Area A Natural Sciences	
	Major:	
	Certificate of:	
	Certificate in:	
(10)CSU	Baccalaureate:	X
(11)Repeatable: (A course may be repeated three times)		0
Effective Term:		

(12) Catalog Description:
This course covers the topics of planets, solar system mechanics, stellar evolution and basic cosmology.

II. COURSE OUTCOMES:

(Specify the learning skills the student demonstrates through completing the course and link critical thinking skills to specific course content and objectives.)

Upon completion of this course, students will be able to:

I. A. Solve simple algebraic problems that apply to astronomy topics. B. Read publications at the college level about introductory astronomy topics through written research paper. C.Apply reasoning skills regarding the science of the universe to solve mathematical and non mathematical problems in astronomy

III. COURSE OBJECTIVES:

(Specify major objectives in terms of the observable knowledge and/or skills to be attained.)

In the process of completing this course, students will:

I. A. Use introductory astronomy vocabulary. B. Learn to apply basic algebra skills to astronomical problems. C. Conduct simple laboratory experiments and run simulation programs on computers that enhance their understanding of basic astronomical phenomenon. D. Learn to understand publication at the college level about introductory astronomy topics through written research paper. E. Develop sound reasoning skills as they are applied in astronomy.

IV. COURSE OUTLINE:

Lecture Content:

A. The mathematics you need for this class
1. Review of exponents and logarithms
2. Review of basic graph reading skills
3. Review of the order of operations

B. History of Astronomy
1. The earliest cosmological ideas
2. The early Greek philosophers
3. The theory of Epicycles
4. Ptolemy
5. Astronomy of Persia and Oriental Culture
6. Copernicus

7. Galileo
8. Kepler
9. Observational Astronomy
10. Non observational astronomy

C. The scientific method as it applies to this class
1. Observation of phenomenon
2. Proposition of theory
3. Data acquisition
4. Data analysis
5. Peer review

D. Our solar system
a. Planets
1. Inner rocky planets
2. Gaseous giants
b. Satellites
1. Asteroid belt
2. Comets
c. Motion
1. Kepler's Laws of motion

E. The Moon
1. Rotation and revolution
2. Phases
3. Eclipses

F. Atoms, Light and Spectra
1. How astronomers "see" the composition of stars
2. Electromagnetic spectrum
3. Elements and spectral lines

G. The Sun
1. Composition of our home star, one layer at a time
2. Fusion of the proton-proton chain

H. Our Milky Way and Galactic structure
1. Milky Way
2. Galactic classification
3. Galactic motion and distribution

I. Stars
1. Stellar Evolution
a. Main sequence stars
b. Giants
c. Dwaves and Neutron stars
2. Constellations

J. Black Holes and Relativity
1. Escape velocity and the limitation of light speed
2. Light cones and embedding diagrams
3. Mass to radius ratios
4. Space-time "warping"
5. Time dilation
6. Length contraction

K. Cosmology
1. Defining the "universe"
2. The nature of "space"
3. The nature of "time"
4. Expansion of the universe
5. Problems and proposed solutions

Lab Content:

A. Measurement

B. Dimensional Analysis

C. Our Location in the Universe

D. Lunar Motion

E. Earth Formation

F. Rotational Motion

G. Gravity and Orbits

H. Solar System Dynamics

I. The Sun

J. Stellar Magnitudes

K. Spectroscopy

L. Stellar Evolution

M. Galaxies

N. Dark Energy

O. Cosmology

V. APPROPRIATE READINGS

Reading assignments may include but are not limited to the following:

I. Sample Text Title:
   1. Recommended - Bennett, Donahue, Schneider and Voit *The Cosmic Perspective Fundamentals,* ed. 1 Pearson Addison Wesley, San Francisco, 2010,

II. Other Readings

___ Global or international materials or concepts are appropriately included in this course
___ Multicultural materials and concepts are appropriately included in this course

If either line is checked, write a paragraph indicating specifically how global/international and/or multicultural materials and concepts relate to content outline and/or readings.

VI. METHODS TO MEASURE STUDENT ACHIEVEMENT AND DETERMINE GRADES:

Students in this course will be graded in at least one of the following four categories. Please check those appropriate. A degree applicable course must have a minimum of one response in category A, B, or C.

A. Writing Check either 1 or 2 below			
X	***1. Substantial writing assignments are required. Check the appropriate boxes below and provide a written description in the space provided.***		
	2. Substantial writing assignments are NOT required. If this box is checked leave this section blank. For degree applicable courses you must complete category B and/or C.		
X	a) essay exam(s)		d) written homework
	b) term or other paper(s)		e) reading reports
X	c) laboratory report(s)		f) other (specify)

Required assignments may include but are not limited to the following:
Essay questions on the exams, written answers to laboratory questions, and homework assignments will require substantial writing.

B. Problem Solving Computational or non-computational problem-solving demonstrations, including:			
X	a) exam(s)	X	d) laboratory reports
X	b) quizzes		e) field work
X	c) homework problems		f) other (specify):

Required assignments may include but are not limited to the following:
There will be computational and non-computational problem solving during exams, quizzes, on homework assignments and on laboratory reports

C. Skill demonstrations, including:			
	a) class performance(s)		c) performance exams(s)

	b) field work		d) other (specify)

Required assignments may include but are not limited to the following:

D. Objective examinations including:			
X	a) multiple choice	X	d) completion
X	b) true/false		e) other (specify):
	c) matching items		

COURSE GRADE DETERMINATION:
Description/Explanation: Based on the categories checked in A-D, it is the recommendation of the department that the instructor's grading methods fall within the following departmental guidelines; however, the final method of grading is still at the discretion of the individual instructor. The instructor's syllabus must reflect the criteria by which the student's grade has been determined. (A minimum of five (5) grades must be recorded on the final roster.)

If several methods to measure student achievement are used, indicate here the approximate weight or percentage each has in determining student final grades.
Homework is 10%, Exams are 60%, Lab Reports are 15%, Participation is 15% of the semester grade.

VII. EDUCATIONAL MATERIALS

For degree applicable courses, the adopted texts, as listed in the college bookstore, or instructor-prepared materials have been certified to contain college-level materials.

Validation Language Level (check where applicable):	College-Level Criteria Met YES	NO
Textbook	X	
Reference materials	X	
Instructor-prepared materials	X	
Audio-visual materials	X	

Indicate Method of evaluation:

Used readability formulae (grade level 10 or higher)	
Text is used in a college-level course	X
Used grading provided by publisher	
Other: (please explain; relate to Skills Levels)	

Computation Level (Eligible for MATH 101 level or higher where applicable)	X	
Content		
Breadth of ideas covered clearly meets college-level learning objectives of this course	X	
Presentation of content and/or exercises/projects:		
Requires a variety of problem-solving strategies including inductive and deductive reasoning.	X	
Requires independent thought and study	X	
Applies transferring knowledge and skills appropriately and efficiently to new situations or problems.	X	

List of Reading/Educational Materials
Recommended - Bennett, Donahue, Schneider and Voit *The Cosmic Perspective Fundamentals,* ed. 1 Pearson Addison Wesley, San Francisco, 2010,

Comments:

_____ This course requires special or additional library materials (list attached).

__ This course requires special facilities:

___ The use of the classroom PHY 70 is required, as it has the lab equipment stored nearby, it has the wireless internet
X___ access for online simulations, and the laptop computers that the students use for the online and purchased simulations software.

Attached Files:

BASIC SKILLS ADVISORIES PAGE The skills listed are those needed for eligibility for English 125, 126, and Math 101. These skills are listed as the outcomes from English 252, 262, and Math 250. In the right hand column, list at least three major basic skills needed at the beginning of the target course and check off the corresponding basic skills listed at the left.

(eligibility for Math 101) (as outcomes for Math 250) __X__ Performing the four arithmetic operations on whole numbers, arithmetic fractions, and decimal fractions. __X__ Making the conversions from arithmetic fractions to decimal fractions, from decimal fractions to percents, and then reversing the process. __X__ Applying the concepts listed above to proportions, percents, simple interest, markup and discount. __X__ Applying the operations of integers in solving simple equations. __X__ Converting between the metric and English measurement systems	Students will use: 1. the four arithmetic functions to complete homework assignments. 2. fraction to decimal conversions to complete homework assignments. 3. both the above listed, as well as the remaining math skills on examinations.
(eligibility for English 125) (as outcomes for English 252) __X__ Writing complete English sentences and avoiding errors most of the time. __X__ Using the conventions of English writing: capitalization, punctuation, spelling, etc. __X__ Using verbs correctly in present, past, future, and present perfect tenses, and using the correct forms of common irregular verbs. __X__ Expanding and developing basic sentence structure with appropriate modification. __X__ Combining sentences using coordination, subordination, and phrases. __X__ Expressing the writer's ideas in short personal papers utilizing the writing process in their development.	Students will use writing skills: 1. to complete their homework assignments. 2. to complete their laboratory activities. 3. during examinations.
(eligibility for English 126) (as outcomes for English 262) __X__ Using phonetic, structural, contextual, and dictionary skills to attack and understand words. __X__ Applying word analysis skills to reading in context. __X__ Using adequate basic functional vocabulary skills. __X__ Using textbook study skills and outlining skills. __X__ Using a full range of literal comprehension skills and basic analytical skills such as predicting, inferring, concluding, and evaluating.	Students will use writing skills:1. to complete their homework assignments. 2. to complete their laboratory activities. 3. during examinations.

Check the appropriate spaces.
__X__ Eligibility for Math 101 is advisory for the target course.
_____ Eligibility for English 126 is advisory for the target course.
_____ Eligibility for English 125 is advisory for the target course.

If the reviewers determine that an advisory or advisories in Basic Skills are all that are necessary for success in the target course, stop here, provide the required signatures, and forward this form to the department chair, the appropriate associate dean, and the curriculum committee.

REQUISITES
No requisites