

Phy 205

PHY 205 Syllabus of Record ASTRONOMY FOR K-8 PRESERVICE TEACHERS

Text: *The Universe at Your Fingertips* by Andrew Fraknoi

Text: *Physics by Inquiry* by L. McDermott (required for PHY 200/201)

Poster: *Atlas of the Solar System* (Geologic Series) Geology of the Solar System, USGS I-2596

Poster: *The Universe* by National Geographic.

Lab Manual: *Project Earth Science: Astronomy* by National Science Teachers Association

Tentative Course Outline:

Week	Topic(s)	Reading*	Lab Topics and (activity) in <i>Project Earth Science: Astronomy and Physics by Inquiry</i> (PbyI)
PLANETS AND STARS			
1	Characteristics of Stars	G	A2 and 5, Observe the Sun
2	Types of Stars	G	HR diagram
3	Terrestrial Planets	C, D	A3,
4	The Moon	N1	Atmosphere, Origin and features
5	Jovian Planets	C	
6	Comets and Asteroids	E	
7	Conditions for Life		A7, 8 and 9, TERC Astrobiology
MOTION IN THE UNIVERSE			
8	Constellations	F	A4, Observing the Night Sky; PbyI, Section 1 Sun Shadows
9	Kepler's laws		Changing position of planets in night sky; Seasonal changes in constellations in night sky
10	Phases of the Moon, Eclipses	A	A11, Observing and Explaining phases PbyI, Section 5 Phases of the Moon
11	Seasons	B	A10, Observing and Explaining length of day/night, position of the Sun, temperatures
LEARNING ABOUT THE UNIVERSE AND SOLAR SYSTEM			
12	History of Exploration of the Universe	J	Scientists and their Tools
13	Hypotheses on Origin of Universe	H	A4, Evidence for the Big Bang
14	History of Exploration of the Solar System	I	A6, Scientists and their Tools
15	Hypotheses on Origin of Solar System		Evidence for Nebular Hypothesis
16	Final		

* = section in *The Universe at Your Fingertips*

N1 =

<http://spacelink.nasa.gov/Instructional.Materials/NASA.Educational.Products/Exploring.the.Moon/>

Course Objectives: The student will:

apply content knowledge about the solar system, galaxy, and universe to solve problems and describe systems, demonstrate confidence in presenting science in the classroom, utilize different methods to teach science and assess learning, compile existing teaching resources and construct new inquiry-based classroom activities, and demonstrate fluency in Michigan science standards and familiarity with the MI Educational Assessment Program.

The information presented on the Topics listed above will be presented in the framework of the Michigan Essential Goals and Objectives for Science Education (K-12). See: Strand V. Using Scientific Knowledge in Earth Science (at http://www.michigan.gov/documents/MichiganCurriculumFramework_8172_7.pdf). And Content Standard 4 (see attached). This framework will prepare you for teaching the Michigan Department of Education’s Science Content Standards.

Nature of the Course:

This course will require you to working cooperatively in teams, solve problems, and think critically and creatively to actively explore the Earth, Sun, and Moon; describe and explain how objects move in the Universe; explain how stars form; and explain how we learn about the Universe. Methods will include hands-on/”minds-on” experiences, inquiry-oriented investigations, constructivism, concept maps, group discussions, demonstrations, and student presentations. The World-Wide-Web will be used as a resource for information. Students will learn by doing instead of passive observation (i.e., standard lecture format). Hands-on, inquiry-based cooperative learning will not be limited to scheduled labs and may also be done during scheduled “lecture” time.

Grades:

Mid-term test	100
Final	100
Lab exercises/work (15 at 10 points each)	150
Lesson plan	100
Portfolio	50
	500 points

There will be a mid-term and final. Both tests will be 100 points and consist of multiple choice, short answer, and short essay questions. Questions will reflect the Michigan Essential Goals and Objectives for Science Education (K-12) and the Michigan Test for Teacher Certification.

Lab is designed to compliment the material presented in lecture by conducting demonstrations, hands-on activities and experiments. Each week there will be graded lab exercises ranging from participating in class or fieldtrips to written exercises from the manual (about 15 labs at 10 points each). All written materials are due at the start of the follow lab.

Each student must develop an ORIGINAL astronomy lesson plan for a 45-minute class period. Lesson plans will follow the constructivist model and consist of: a written one-page outline describing the lesson (due at midterm) and a completed written lesson plan. Samples of lesson plans are available at <http://www1.gvsu.edu/mattoxs/landforms.html>. Your lessons should include line drawings, diagrams, or photos (as needed) that are in the public domain (i.e., not

copyrighted). Links to web resources are welcome. You will need to provide one copy of your completed lesson to each classmate.

Course grades will be on a fixed scale of $>93.3\% = A$, $90\%-93.3\% = A-$, $89.9- >86.6 = B+$, $86.6- >83.3 = B$, $83.3-80\% = B-$, $79.9- >76.6 = C+$, $76.6- >73.3 = C$, $73.3-70\% = C-$, $69.9- >66.6 = D+$, $66.6- >83.3 = D$, $<60\% = F$.

Attendance. Although attendance will not be taken, students are expected to arrive at class on time and participate fully in all lectures, labs, discussions and activities. Absenteeism will directly affect your grade by its effect on your assignments, tests, and labs because these materials will be based on material covered in class. Missed labs and exams CANNOT be made up except in cases of prolonged, serious, excused illness. Late labs will lose 10% of their graded value for each day they are late.

Extra Credit (for a possible maximum addition of 25 points):

1. Identify 10 constellations in the evening or morning sky.

All students and the teacher are expected to be aware of and follow GVSU's rules of Academic Honesty. See: <http://www.gvsu.edu/acad/acadreg1.html>