

Fresno Pacific University  
Center for Professional Development

Course Syllabus

**SCI 917A Astronomy: Our Solar System**

Instructor: Mary Bennett, MA (Curriculum Services Associates)

Three semester units

**Contact Information**

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Units are graduate level, professional development units primarily used for professional advancement and are accredited through Fresno Pacific University.

**Course Dates**

Self-paced; students may enroll at any time and take up to one year to complete assignments.

You have up to one year from the date of registration, and no less than three weeks (one week per credit), to complete the course.

**Course Description**

Explore the major events in the history of astronomy as you journey through our solar system through readings, multimedia presentations and observations. The goal of this course is to expand your understanding of the night sky through active investigations. As you strengthen your knowledge of the solar system, you will develop standards-based lessons and activities to enrich your own science curriculum. The rich, engaging environment of the online classroom will allow you to connect with other educators as you share resources, lessons, and ideas. The textbook, *Astronomy* by Dinah Moche, is to be purchased separately and Internet access is required.

**Course Materials**

- Students are required to purchase the Textbook: *Astronomy: A Self-Teaching Guide* by Dinah Moche. From stars, planets and galaxies, to black holes, The Big Bang, and life in space, this book brings the wonders of the cosmos to life. Offering a unique, successful, self-teaching format, this practical, user-friendly guide makes it easy for you to quickly grasp the basic principles of astronomy and build gradually on what you have learned.

This book may be purchased on Amazon.com

[http://www.amazon.com/Astronomy-Self-Teaching-Dinah-L-Moche/dp/0471265187/ref=sr\\_1\\_1?ie=UTF8&s](http://www.amazon.com/Astronomy-Self-Teaching-Dinah-L-Moche/dp/0471265187/ref=sr_1_1?ie=UTF8&s)

or

Allbookstores.com

<http://www.allbookstores.com/book/0471265187>

- Relevant online resources that support course content and encourage further investigation. In addition to the Internet resources listed in the course content, there is a Delicious site with many Astronomy resources <http://delicious.com/maryebennett>.

**Course Requirements**

Course assignments are completed in Moodle via asynchronous Discussion Forums, and Assignments which provide the students with formative assessment throughout the course. Course participants will be required to:

1. Complete all required reading and viewing assignments.
2. Engage in Internet explorations.
3. Complete all writing assignments and submit them in Moodle.
4. Participate in all discussion forums and post responses that reflect critical thinking and demonstrate positive online interaction techniques.

### **Technology Requirements**

In order to successfully complete the course requirements, course participants will need Internet access, be able to send and receive email, know how to manage simple files in a word processing program, and have a basic understanding of the Internet.

Please remember that the instructor is not able to offer technical support. In the event that you need technical support, please contact your Internet Service Provider.

### **Moodle**

This course will be delivered totally online. Moodle is a learning management system that provides students access to online resources, documents, graded assignments, quizzes, discussion forums, etc. to with an easy to learn and use interface.

### **National Board for Professional Teaching Standards**

In an effort to enhance the learning experiences, as well as demonstrate knowledge, skills, abilities, and commitment, teachers will infuse the five core propositions set forth by The National Board for Professional Teaching Standards in their teaching practices. This will be accomplished as teachers successfully implement appropriate activities in their classroom and reflect upon the experience. In addition, teachers will be networking with their colleagues as part of a learning community.

<http://www.nbpts.org>

1. Teachers are committed to students and their learning.
2. Teachers know the subjects they teach and how to teach those subjects to students.
3. Teachers are responsible for managing and monitoring student learning.
4. Teachers think systematically about their practice and learn from experience.
5. Teachers are members of learning communities.

### **National Standards**

As students progress through this course they will be responsible for identifying and aligning course content to state or national science standards. In addition, they will reflect upon how the standards affect and guide teaching practices.

The topics of this course are closely aligned with the concepts emphasized in the National Education Science Standards established by the National Academy of Sciences. Included are the Teaching Standards, Program Standards and Content Standards.

National Education Science Standards

[http://www.nap.edu/catalog.php?record\\_id=4962](http://www.nap.edu/catalog.php?record_id=4962)

### **Primary Learning Outcomes**

Students completing this course will:

1. Cite major events in the history of astronomy. (NBPTS 2, 5)
2. Discuss the historic theories of astronomy. (NBPTS 2, 5)
3. Explain the mechanics of our own solar system. (NBPTS 2, 5)
4. Recognize constellations and cite the mythology related to the major constellations in the night sky. (NBPTS 2, 5)
5. Perceive the future of astronomy into the 21st century. (NBPTS 2, 5)
6. Apply grade level state or district science learning standards to develop integrated lesson plans with other subjects including math, natural history and social studies. (NBPTS 2,3,4)
7. Promote staff interaction through observation and sharing. (NPTS 5)
8. Design appropriate learning activities for students that demonstrate mastery or progression towards meeting the standards and describe each experience through reflective writing. (NBPTS 2,3,4)
9. Assess and reflect upon teaching practices and the classroom environment in relation to the course content by responding to focus questions. (NBPTS 4,5)

## **Schedule of Topics and Assignments**

### **Orientation**

- Determine if you are prepared to take an online course.
- Explore the tools and technology used in an online classroom.

### **Standards-Based Instruction** (PLO 6,8,9)

- Locate and explore relevant science standards.
- Reflect upon how standards guide teaching practices.

### **Reading Assignment** (PLO 1,2,3,4,5,8)

- Read the text, *Astronomy: A Self-Teaching Guide* by Dinah Moche.
- Develop grade-level appropriate focus questions.

### **Virtual Field Trip** (PLO 6,7,8)

- Locate and explore a Virtual Field Trip appropriate for the level of your students.
- Design and develop a lesson based on the chosen Virtual Field Trip.

### **Listening Assignment** (PLO 6,7,8)

- Select and listen to at least six Star Date Online programs and reflect upon how the topics may be used in the classroom.

### **Field Assignment** (PLO 3,4,8)

- Visit the Night Sky relevant to your location and summarize your experience.

### **Integrated Unit** (PLO 6 7,8)

- Develop an integrated unit of study around a specific Astronomy concept.

### **Reflective Essay** (PLO 8)

- Reflect upon the course content and analyze the implications for teaching.

### **Evidence of Learning**

- Course instructor observed evidence of understanding of course objectives as demonstrated through students' presentation of their knowledge of course concepts guided by focus questions.
- Course instructor observed evidence of understanding of course objectives as demonstrated through

students' reflective writing assignments.

- Course instructor observed evidence of understanding of course objectives as demonstrated through students' correlation of the activities to state, national, or district standards.
- Student demonstrated their understanding of appropriate methods of teaching science through the design of lessons for classroom implementation.
- Student demonstrated their understanding of integrating other subject areas into the teaching of science through the suggestions described in each lesson.
- Student demonstrated reflective teaching practices through connections to course assignments and primary learning outcomes as described in a reflective essay.

### **Grading Options**

Course assignments are graded with the use of a Scoring Rubric. Course participants have the option of requesting a letter grade or a credit/no credit. If you would like a letter grade, please check the appropriate box on the Grade Form and the Procedure for Completing Coursework.

### **Grading Policies**

- 100 total points possible  
100 – 90 = A  
89 – 70 = B or Credit Grade  
Below 70 points = no credit

- The discernment between an A or a B is at the discretion of the instructor based on the quality of work submitted.
- Coursework falling short of a quality equaling a B or a Credit Grade will be returned with further instructions.
- **All assignments must be completed in order to receive a grade.** In addition, all assignments are expected to reflect the quality that teacher-training institutions require of professional educators. If completed assignments do not meet this standard, students will be notified with further instructions from the instructor.
- Writing Requirements

**Superior:** Writing is clear, succinct, and reflects graduate level expectations.

**Standard:** Writing is acceptable with very few mistakes in grammar and spelling.

**Sub-standard:** Writing contains noticeable mistakes in grammar and spelling.

### **Rubric for Evaluating Assignments**

#### **Assignment 1**

#### **Standards-Based Instruction**

5 points possible

Superior=5

Standard=4

Sub-standard=3

#### **Sub-Standard**

State or national standards were minimally explored, paragraph included a vague description of how the standards affect and guide the teaching within the district.

#### **Standard**

State or national standards for the appropriate grade level were explored, paragraph included a description of

how the standards affect and guide the teaching within the district.

### **Superior**

State or national standards for the appropriate grade level were thoroughly explored, paragraph included a comprehensive description of how the standards affect and guide the teaching within the specific district.

## **Assignment 2**

### **Reading Assignment**

20 points possible

Superior=18-20

Standard=16-17

Sub-standard=14-16

### **Sub-Standard**

Less than 20 questions were developed and answers were vague or missing. Questions were somewhat developed for the appropriate grade level but did not require students to use higher level thinking skills.

### **Standard**

20 questions were developed and answers were presented. All questions were appropriate for the chosen grade level. Some questions required students to use higher level thinking skills

### **Superior**

20 or more questions were developed and thoroughly answered and answers were comprehensive, clear, and detailed. All questions were highly appropriate for the chosen grade level. Questions required students to use higher level thinking skills

## **Assignment 3**

### **Virtual Field Trip**

20 points possible

Superior=18-20

Standard=16-17

Sub-standard=14-16

### **Sub-Standard**

Vague description of the Virtual Field Trip is defined. Discoveries found on the field trip are missing or vague. The activity presented is not appropriate for the chosen grade level. A connection to classroom implementation is unclear.

### **Standard**

Detailed description of the Virtual Fieldtrip is described. Discoveries found on the field trip are noted. An appropriate activity is presented for the chosen grade level. A connection to classroom implementation was described.

### **Superior**

Comprehensive, clear, and detailed description of the Virtual Fieldtrip is described. Major discoveries found on the field trip are noted. Comprehensive, clear and detailed activity is presented and is highly appropriate for the chosen grade level. A clear connection to classroom implementation was described and included appropriate suggestions for using the selected website.

## **Assignment 4**

### **Listening Assignment**

10 points possible

Superior=9-10

Standard=8

Sub-standard=7

### **Sub-Standard**

Less than six StarDate programs were listened to and summarized. Reflections were vague and disjointed. The date, subject of the program and a description of what was learned was missing or unclear.

**Standard**

Six StarDate programs were listened to and summarized. Reflections were included the date, subject of the program as well as a description of what was learned. A connection to classroom implementation was described and included suggestions for using the selected program.

**Superior**

Six or more StarDate programs were listened to and comprehensively summarized. Reflections were complete and included the date, subject of the program as well as a detailed description of what was learned. A clear connection to classroom implementation was described and included appropriate suggestions for using the selected program.

**Assignment 5**

**Field Assignment The Night Sky**

10 points possible

Superior=9-10

Standard=8

Sub-standard=7

**Sub-Standard**

Vague description of the exploration is defined. Less than 100% of all the questions were answered and presented.

**Standard**

Clear description of the exploration is defined. 100% of all the questions were answered and presented.

**Superior**

Comprehensive, clear, and detailed description of the exploration is defined. 100% of all the questions were thoroughly answered and presented, answers were comprehensive, clear, detailed and displayed critical thinking.

**Assignment 6**

**Integrated Unit**

20 points possible

Superior=18-20

Standard=16-17

Sub-standard=14-16

**Sub-Standard**

Less than three lessons were defined, were not correlated to the activities, objectives were missing or vague, reflections contained a minimal description of the grouping, procedures, and there were no connections to other subject areas.

**Standard**

Three lessons were defined, standards were correlated to most of the activities, the objectives were adequately stated but not always specific, descriptions were generally clear but did not always comprehensively describe the groupings, and procedures, few suggestions for integrating other subject areas, students were not always required to use critical thinking skills.

**Superior**

Three or more lessons were defined, standards were correlated to all activities, objectives were specific and stated in terms of observable learner outcomes, there was a clear and concise description of the groupings, the procedure, and suggestions for integrating other subject areas, and required students to use critical thinking skills.

**Assignment 7**

## **Reflective Essay**

5 possible points

Superior=5

Standard=4

Sub-standard=3

### **Sub-Standard**

Reflection is vague in relation to course content, there is little or no indication plans for future implementation and there is not a connection between course assignments and primary learning outcomes.

### **Standard**

Reflection is specific to the course content, strategies presented in the course, plans for future implementation is defined, an adequate description of the connection between the course assignments and the primary learning outcomes is presented.

### **Superior**

Reflection displays critical thinking that is clear, concise, and specific to the course content, and plans for future implementation are included, a clear connection between the course assignments and the primary learning outcomes is presented.

## **Assignment 8**

### **Discussion Boards**

10 points possible

Superior=9-10

Standard=8

Sub-standard=7

### **Sub-Standard**

Less than 100% of Discussion Board assignments were completed, postings minimally responded to the question and the information is superficial without any evidence of insight or analysis, may be completely off topic, no connections are made to content or real-life situations, attachments are missing as described in the assignments.

### **Standard**

100% of all Discussion Board assignments were completed, postings respond to the question and deliver information that demonstrate insight, thought, and analysis, connections are sufficiently made to previous or current content or to real-life situations, attachments are present as described in the assignments.

### **Superior**

100% of all Discussion Board assignments were completed, postings fully addressed the question and delivers information that is full of insight, thought, and analysis, connections are made to previous or current content or to real-life situations, appropriate attachments are present as described in the assignments.

## **Instructor/Student Contact**

Throughout the course students will be communicating with the instructor and their classmates on a regular basis through the use of six asynchronous discussion forums. A Virtual Office is utilized for class questions and students are provided with an 800 number in the event they want to make phone contact. In addition, students are encouraged to email the instructor at any time. Students will also receive feedback on the required assignments as they are submitted.

## **How to send Email**

The subject line of all Email must contain the following information:

course number your last name, first initial.

example: SCI 917 Bennett, M.

Email sent without this subject line will not be opened.

## Resources

### 1. Teachers First Resources

<http://www.teachersfirst.com/tchr-subj-date.cfm?var1=3&var3=1&var2=5>

Excellent collection of lessons and activities related to Astronomy.

### 2. The Space Place

<http://spaceplace.nasa.gov/en/kids/>

Games, animations, projects, and fun facts about Earth, space and technology.

### 3. National Aeronautical and Space Administration (NASA) <http://www.nasa.gov/>

Check out the links for educators and the NASA Quest

<http://quest.arc.nasa.gov/about/index.html>

### 4. Amazing Space

<http://amazing-space.stsci.edu/>

Collection of Web-based activities designed for classroom use.

### 5. Imagine the Universe

[http://imagine.gsfc.nasa.gov/docs/teachers/teachers\\_corner.html](http://imagine.gsfc.nasa.gov/docs/teachers/teachers_corner.html)

Lesson plans and activities

### 6. Beyond Einstein: From Big Bang to Black Hole

<http://universe.nasa.gov/>

The program consists of a series of space missions, large and small, that push Einstein's theories to their limits

### 7. Sky Spy Safari

<http://science.hq.nasa.gov/skyspy/noaccess.html>

Explore the stars by selecting the time and day – very interactive!

### 8. StarChild

<http://starchild.gsfc.nasa.gov/docs/StarChild/StarChild.html>

### 9. Space Today Online

<http://www.spacetoday.org/>

### 10. The Galaxy

[http://www.nasa.gov/worldbook/galaxy\\_worldbook.html](http://www.nasa.gov/worldbook/galaxy_worldbook.html)

This website supports the understanding that galaxies are cluster of billions of stars and may have different shapes.

### 11. HubbleSite

<http://hubblesite.org/>

### 12. Hubble Space Telescope

<http://hubble.nasa.gov/>

The Hubble Space Telescope (HST) is a large, space-based observatory which has revolutionized astronomy by providing unprecedented deep and clear views of the Universe, ranging from our own solar system to extremely remote fledgling galaxies forming not long after the Big Bang 13.7 billion years ago.

13. NASA Astronomy Picture of the Day

<http://antwarp.gsfc.nasa.gov/apod/astropix.html>

Each day a different image or photograph of our fascinating universe is featured, along with a brief explanation written by a professional astronomer.

14. Sky and Telescope Magazine

<http://www.skyandtelescope.com/>

New, observing tips, how-to and more for Astronomers.

15. BBC Science and Nature: Space

<http://www.bbc.co.uk/science/space/>

16. Your Travel Guide to the Solar System

<http://www.bbc.co.uk/science/space/solarsystem/>

17. NOVA

[http://www.pbs.org/wgbh/nova/archive/int\\_spac.html](http://www.pbs.org/wgbh/nova/archive/int_spac.html)

18. World Wide Telescope

<http://www.worldwidetelescope.org/experiencelt/Experiencelt.aspx>

Download the free World Wide Telescope to see the same images that scientists at NASA use for their research.

19. Google Sky

Google Sky is a free “virtual telescope” that allows you to explore the universe while on the Internet. Google Sky is a great way to view the planets, constellations, birth of galaxies, and other items in the universe. It uses some of the best images from the Hubble Telescope and other observatories around the World

About Google Sky

<http://www.google.com/sky/about.html>

20. Using Google Sky in your Classroom

<http://www.google.com/educators/skyideas.html>

### **Bibliography**

1. Berry, Richard. *Build Your Own Telescope*. Waukesha, Wisconsin: Kalmbach Publishing Company, 1985.
2. Eicher, David J. *Beyond the Solar System*. Waukesha, Wisconsin: Kalmbach Publishing Company, 1991.
3. Ferris, Timothy. *Galaxies*. San Francisco, California: Sierra Club Books, 1995.
4. Malin, David. *A View of the Universe*. Cambridge, Massachusetts: Sky Publishing Corporation, 1993.

### **Policy on Plagiarism**

All people participating in the educational process at this university are expected to pursue honesty and integrity in all aspects of their academic work. Academic dishonesty, including plagiarism, will be handled according to the procedures set forth in the university catalog.

### **University Information**

Graduate level course work reflects Fresno Pacific University’s Desired Student Learning Outcomes as it applies to professional development to demonstrate the following:

- Oral and written communication in individual and group settings
- Content knowledge, and application of such knowledge in the student’s area of interest to affect

change

- Reflection for personal and professional growth
- Critical thinking
- Cultural and global perspectives to understand complex systems
- Computational/methodological skills to understand and expand disciplines, including an understanding of technological systems