

## SCI-917: Astronomy: Our Solar System

### Independent Study Online Course Syllabus

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**Number of Graduate Semester Units:** 3 units  
**Target Audience:** K – 12<sup>th</sup> grade teachers  
**Course Access:** <https://connect.fresno.edu>

### Course Description

Embark on a journey through the history of astronomy and our solar system! Through readings, media presentations, and hands-on observations, you'll deepen your understanding of the night sky while exploring major milestones in astronomy.

This course will guide you in exploring major milestones in astronomy while actively investigating celestial phenomena. You'll have the opportunity to analyze and apply the Next Generation Science Standards (NGSS) and discover how they connect to standards-based instruction, equipping you to create impactful lessons and activities for your students. You will also collaborate with fellow educators in a supportive online environment where you can exchange resources, share innovative teaching strategies, and build a robust science curriculum.

Whether you're in the classroom or not, assignments are tailored to ensure every participant benefits. Join us to transform your science curriculum and inspire your students to reach for the stars!

**Note:** Required book must be acquired separately.

### Required Texts and Course Materials

**Book:** Moche, D. L. (2014). *Astronomy: A Self-Teaching Guide* (8<sup>th</sup> ed.). Wiley. ISBN-13: 978-1620459904 <https://www.amazon.com/Astronomy-Self-Teaching-Eighth-Teaching-Guides/dp/1620459906>

**Canvas:** This course will be delivered totally online. Canvas is a web-based learning management system (LMS) that provides students access to online resources, documents, videos, assignments, quizzes, forums, etc. Canvas is easy to learn and has a user-friendly interface.

**Online Resources:** Relevant online resources that support the course content and encourage further investigation will be available throughout the course assignments. Active hyperlinks are utilized throughout the course and will link to the appropriate information when clicked. These include videos, podcasts, worksheets, online activities, journal articles and other resources.

## Course Dates

Self-paced; students may enroll at any time and take up to one year, from the date of registration, to complete assignments. Students may complete assignments in no less than three weeks for a 3-unit course (one week per unit).

## National Standards Addressed in This Course

**Next Generation Science Standards** (<http://nextgenscience.org/>)

The concepts covered in this course align within the Disciplinary Core Idea of [Earth and Space Sciences \(ESS\)](#) in Elementary, Middle School and High School.

**Common Core State Standards Initiative** (<http://www.corestandards.org/the-standards>)

The standards are:

- Aligned with college and work expectations.
- Clear, understandable and consistent.
- Include rigorous content and application of knowledge through high-order skills.
- Build upon the strengths and lessons of current state standards.
- Informed by other top performing countries so that all students are prepared to succeed in our global economy and society.
- Evidence and research based.

As you create lessons for your students you will be exploring the Common Core Standards and identifying how the lessons and activities you develop align with those standards.

## Continuing Education Student Learning Outcomes (CE-SLO)

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|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CE-SLO 1 | Demonstrate proficient written communication by articulating a clear focus, synthesizing arguments, and utilizing standard formats in order to inform and persuade others, and present information applicable to targeted use. |
| CE-SLO 2 | Demonstrate comprehension of content-specific knowledge and the ability to apply it in theoretical, personal, professional, or societal contexts.                                                                              |
| CE-SLO 3 | Reflect on their personal and professional growth and provide evidence of how such reflection is utilized to manage personal and professional improvement.                                                                     |
| CE-SLO 4 | Apply critical thinking competencies by generating probing questions, recognizing underlying assumptions, interpreting and evaluating relevant information, and applying their understandings to the professional setting.     |
| CE-SLO 5 | Reflect on values that inspire high standards of professional and ethical behavior as they pursue excellence in applying new learning to their chosen field.                                                                   |

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| CE-SLO 6 | Identify information needed in order to fully understand a topic or task, organize that information, identify the best sources of information for a given enquiry, locate and critically evaluate sources, and accurately and effectively share that information. |
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### Course Student Learning Outcomes (C-SLO)

| <b>Student Learning Outcomes for This Course</b><br>By the end of this course student will be able to:                                                                                                                                                            | <b>National Standards Addressed*</b> | <b>CE-SLO Addressed**</b> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|---------------------------|
| 1. Locate, explore, and reflect upon science standards, including the Next Generation Science Standards (NGSS), to understand how they guide teaching practices in Earth and Space Science.                                                                       |                                      | CE 1,2,4,6                |
| 2. Demonstrate an understanding of the basic principles of astronomy and the structure of the Solar System through research and presentations.                                                                                                                    | ESS1A, ESS1B                         | CE 1,2,4,6                |
| 3. Select and utilize multimedia resources, to explore astronomy topics and reflect on their classroom applications.                                                                                                                                              | ESS1A, ESS1B,                        | CE 1,2,4,6                |
| 4. Participate in astronomy observation experiences and summarize insights and potential classroom applications.                                                                                                                                                  | ESS1A, ESS1B,                        | CE 1,2,4,6                |
| 5. Create assignments, activities, and assessments that align with selected Solar System topics, relevant standards, and clear learning objectives to evaluate student understanding effectively.                                                                 | ESS1A, ESS1B,                        | CE 1,2,4,6                |
| 6. Develop an interdisciplinary unit of study focused on the Solar System, guided by NGSS and the Common Core State Standards (or other applicable standards), that incorporates engaging resources, meaningful assessments, and hands-on learning opportunities. | ESS1A, ESS1B,                        | CE 1,2,4,6                |
| 7. Collaborate with colleagues in an active learning environment.                                                                                                                                                                                                 |                                      | CE 1,2,4,5,6              |
| 8. Reflect on and evaluate teaching practices and the classroom environment by thoughtfully connecting insights to the course content.                                                                                                                            |                                      | CE 3, CE 5                |

\* Please refer to the section on **National Standards Addressed in This Course**

\*\* Please refer to the section on **Continuing Education Program Student Learning Outcomes**

## Topics, Assignments, and Activities

| Module Title                                               | Module Assignments and Activities                                                                                                                                                                                          | Points Possible   |
|------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| <b>Home Page</b>                                           | <ul style="list-style-type: none"> <li>Welcome Video</li> <li>Course Syllabus</li> <li>Policies and Procedures</li> <li>Introduce Yourself Forum</li> </ul>                                                                |                   |
| <b>Module 1:</b> Getting Started                           | <ul style="list-style-type: none"> <li>1.1 Discussion: Introductions</li> <li>Learner Profile Survey</li> </ul>                                                                                                            | 10                |
| <b>Module 2:</b> Standards-Based Instruction               | <ul style="list-style-type: none"> <li>Read: Standards-Based Instruction</li> <li>2.1 Assignment: Action Plan for Standards-Based Instruction</li> <li>2.2 Discussion: The Framework for K-12 Science Education</li> </ul> | 50<br>10          |
| <b>Module 3:</b> Astronomy: A Self-Teaching Guide          | <ul style="list-style-type: none"> <li>Read: Astronomy: A Self-Teaching Guide</li> <li>3.1 Assignment: Astronomy: A Self-Teaching Guide Presentation</li> <li>3.2 Discussion: The Fascinating Solar System</li> </ul>      | 50<br>10          |
| <b>Module 4:</b> StarDate Online                           | <ul style="list-style-type: none"> <li>4.1 Assignment: Star Date Radio</li> <li>4.2 Discussion: Using McDonald Observatory and StarDate Resources in your Classroom</li> </ul>                                             | 50<br>10          |
| <b>Module 5:</b> Virtual Journeys Through the Solar System | <ul style="list-style-type: none"> <li>5.1 Assignment: Virtual Field Trip</li> <li>5.2 Discussion: Sharing Virtual Field Trip Experiences</li> </ul>                                                                       | 50<br>10          |
| <b>Module 6:</b> The Night Sky                             | <ul style="list-style-type: none"> <li>6.1 Assignment: Observing the Night Sky</li> <li>6.2 Discussion: The Night Sky</li> </ul>                                                                                           | 50<br>10          |
| <b>Module 7:</b> Assessing Knowledge of the Solar System   | <ul style="list-style-type: none"> <li>7.1 Assignment: The Solar System Assessment</li> <li>7.2 Discussion: The Solar System Assessment</li> </ul>                                                                         | 50<br>10          |
| <b>Module 8:</b> Integrated Unit                           | <ul style="list-style-type: none"> <li>8.1 Assignment: Integrated Unit</li> <li>8.2 Discussion: Sharing Lesson Plans</li> </ul>                                                                                            | 100<br>10         |
| <b>Module 9:</b> Reflection                                | <ul style="list-style-type: none"> <li>9.1 Discussion: Final Course Reflection</li> </ul>                                                                                                                                  | 10                |
| <b>Course Wrap-up –</b> Grading and Evaluation             | <ul style="list-style-type: none"> <li>Final Reflection Forum</li> <li>Course Evaluation</li> <li>Course Completion Checklist</li> <li>Grade Request / Transcript Request</li> </ul>                                       |                   |
|                                                            | <b>TOTAL POINTS</b>                                                                                                                                                                                                        | <b>490 points</b> |

## Grading Policies, Rubrics, and Requirements for Assignments

### Grading Policies

- Assignments will be graded per criteria presented in the course rubrics.
- A = 90-100% and B = 80-89%, (anything below 80% will not receive credit.)
- The discernment between an A or a B letter grade is at the discretion of the instructor based on

the quality of work submitted (see course rubrics).

- Coursework falling below a B grade will be returned with further instructions.
- All assignments must be completed to receive a grade and 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.

### Grading Rubrics

| Grade | Percent   | Description  | Rubric                                                                                                                                                                                 |
|-------|-----------|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A     | 90-100%   | Excellent    | Meets all course / assignment requirements with significant evidence of subject mastery and demonstration of excellent graduate level professional development scholarship.            |
| B     | 80-89%    | Very Good    | Adequately meets criteria for all course/assignment requirements - demonstrates subject competency with very good graduate level professional development scholarship.                 |
| NC    | Below 80% | Unacceptable | Does not meet the minimum criteria for all course/assignment requirements and demonstrated little, if any, evidence of acceptable graduate level professional development scholarship. |

### Writing Requirements

- **Superior:** Writing is clear, succinct, and reflects graduate level expectations. Clearly addresses all parts of the writing task. Maintains a consistent point of view and organizational structure. Includes relevant facts, details, and explanations.
- **Standard:** Writing is acceptable with very few mistakes in grammar and spelling. Addresses most parts of the writing task. Maintains a mostly consistent point of view and organizational structure. Includes mostly relevant facts, details, and explanations.
- **Sub-standard:** Writing contains noticeable mistakes in grammar and spelling. Does not address all parts of the writing task. Lacks a consistent point of view and organizational structure. May include marginally relevant facts, details, and explanations.

### Lesson Plan Requirements

- **Superior:** Instructional goals and objectives clearly stated. Instructional strategies appropriate for learning outcome(s). Method for assessing student learning and evaluating instruction is clearly delineated and authentic. All materials necessary for student and teacher to complete lesson clearly listed.
- **Standard:** Instructional goals and objectives are stated but are not easy to understand. Some instructional strategies are appropriate for learning outcome(s). Method for assessing student learning and evaluating instruction is present. Most materials necessary for student and teacher to complete lesson are listed.
- **Sub-standard:** Instructional goals and objectives are not stated. Learners cannot tell what is expected of them. Instructional strategies are missing or strategies used are inappropriate. Method for assessing student learning and evaluating instruction is missing. Materials necessary for student and teacher to complete lesson are missing.

## **Instructor/Student Contact Information**

Throughout the course participants will be communicating with the instructor and their classmates on a regular basis using asynchronous discussion forums. Students are provided with instructor contact information in the event they want to make email or phone contact. In addition, students are encouraged to email or phone the instructor at any time. Students will also receive feedback on the required assignments as they are submitted.

## **Forums**

Participation is an important expectation of this course and all online courses. Online discussions promote reflection and analysis while allowing students to appreciate and evaluate positions that others express. While students may not be engaging with the same students throughout this course, they will be expected to offer comments, questions, and replies to the discussion question whenever possible. The faculty role in the discussion forum is that of an observer and facilitator.

## **Coursework Hours**

Based on the Carnegie Unit standard, a unit of graduate credit measures academic credit based on the number of hours the student is engaged in learning. This includes all time spent on the course: reading the textbook, watching videos, listening to audio lessons, researching topics, writing papers, creating projects, developing lesson plans, posting to discussion boards, etc. Coursework offered for FPU Continuing Education graduate credit adheres to 45 hours per semester unit for the 900-level courses. Therefore, a student will spend approximately 135 hours on a typical 3-unit course.

## **Services for Students with Disabilities**

Students with disabilities are eligible for reasonable accommodations in their academic work in all classes. In order to receive assistance, the student with a disability must provide the Academic Support Center with documentation, which describes the specific disability. The documentation must be from a qualified professional in the area of the disability (i.e. psychologist, physician or educational diagnostician). Once documentation is on file, arrangements for reasonable accommodations can be made. For more information and for downloadable forms, please go to <https://www.fresno.edu/departments/disability-access-education>.

## **Plagiarism and Academic Honesty**

All people participating in the educational process at Fresno Pacific University are expected to pursue honesty and integrity in all aspects of their academic work. Academic dishonesty, including plagiarism, will be handled per the procedures set forth in the Fresno Pacific University Catalogue and Handbook - <https://handbook.fresno.edu/graduate/academic-policies>

## **Technology Requirements**

To successfully complete the course requirements, course participants will need Internet access, can 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. If you need technical support, please contact your Internet Service Provider.

**Getting Help with Canvas:** If you need help with Canvas, please contact the FPU Help Desk by phone: (559) 453-3410 or email: [helpdesk@fresno.edu](mailto:helpdesk@fresno.edu). Help is available Mon-Fri 8:00 am to 7:00 pm.

## Final Course Grade and Transcripts

When all work for the course has been completed, students will need to request their final grade by accessing the form at [ce.fresno.edu/grade-request](https://ce.fresno.edu/grade-request). Once the instructor receives the request and posts their final grade, students will receive an email communication from the University. Please allow at least two weeks for the final grade to be posted before you order your transcripts online.

## University Policies and Procedures

Students are responsible for becoming familiar with the information presented in the Academic Catalog and for knowing and observing all policies and procedures related to their participation in the university community. A summary of university policies may be found on the university website at <https://www.fresno.edu/departments/registrars-office/academic-catalogs>.

## Fresno Pacific University Student Learning Outcomes (FPU-SLO)

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|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| FPU-SLO 1 | <b>Oral Communication:</b> Students will <i>exhibit</i> clear, engaging, and confident oral communication – in both individual and group settings – and will critically <i>evaluate</i> content and delivery components.                                                                           |
| FPU-SLO 2 | <b>Written Communication:</b> Students will <i>demonstrate</i> proficient written communication by <i>articulating</i> a clear focus, <i>synthesizing</i> arguments, and utilizing standard formats in order to <i>inform</i> and <i>persuade</i> others.                                          |
| FPU-SLO 3 | <b>Content Knowledge:</b> Students will <i>demonstrate</i> comprehension of content-specific knowledge and the ability to apply it in theoretical, personal, professional, or societal contexts.                                                                                                   |
| FPU-SLO 4 | <b>Reflection:</b> Students will <i>reflect</i> on their personal and professional growth and <i>provide evidence</i> of how such reflection is utilized to manage personal and vocational improvement.                                                                                            |
| FPU-SLO 5 | <b>Critical Thinking:</b> Students will <i>apply</i> critical thinking competencies by <i>generating</i> probing questions, <i>recognizing</i> underlying assumptions, <i>interpreting</i> and <i>evaluating</i> relevant information, and <i>applying</i> their understandings to new situations. |
| FPU-SLO 6 | <b>Moral Reasoning:</b> Students will <i>identify</i> and <i>apply</i> moral reasoning and ethical decision-making skills, and <i>articulate</i> the norms and principles underlying a Christian worldview.                                                                                        |
| FPU-SLO 7 | <b>Service:</b> Students will <i>demonstrate</i> service and reconciliation as a way of leadership.                                                                                                                                                                                                |
| FPU-SLO 8 | <b>Cultural and Global Perspective:</b> Students will <i>identify</i> personal, cultural, and global perspectives and will employ these perspectives to <i>evaluate</i> complex systems.                                                                                                           |
| FPU-SLO 9 | <b>Quantitative Reasoning:</b> Students will accurately <i>compute</i> calculations and symbolic operations and <i>explain</i> their use in a field of study.                                                                                                                                      |

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|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| FPU-SLO 10 | <b>Information Literacy:</b> Students will <i>identify</i> information needed in order to fully understand a topic or task, <i>explain</i> how that information is organized, <i>identify</i> the best sources of information for a given enquiry, <i>locate</i> and critically <i>evaluate</i> sources, and accurately and effectively <i>share</i> that information. |
|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|