

**ASSESSMENT REPORT
FOR ACADEMIC YEAR 2017-2018**

ASTRONOMY MINOR

**Department of Physics & Astronomy
University of San Francisco**

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1 LOGISTICS & PROGRAM LEARNING OUTCOMES

1.1 PHYSICS & ASTRONOMY CONTACT PERSON (FACULTY ASSESSMENT COORDINATOR).

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1.2 PHYSICS & ASTRONOMY DEPARTMENT MISSION STATEMENT

No changes were made to the program mission statement since the last assessment cycle in October 2017.

The mission of the Physics & Astronomy Department is to provide our students with the fundamental knowledge and the practical tools of a rigorous physics education that will help them be players and leaders in shaping a more humane world. The Physics program is implemented via a comprehensive coverage of experimental, theoretical, and computational physics, and by combining coursework together with on- and off-campus research and exposure to cutting-edge equipment and laboratory techniques. This rigorous training prepares students for careers and/or graduate studies in any discipline within fundamental or applied science (physics, astronomy, mathematics, chemistry, biology, etc); in any of the standard engineering fields; in education; in medicine and related disciplines; and many other fields, such as law, financial analysis, or positions in the high-technology sector of the global economy.

1.3 ASTRONOMY MINOR LEARNING OUTCOMES (PLOs)

No changes were made to the program learning outcomes (PLOs) since the last assessment cycle in October 2017.

1. • **PLO 1.**

Demonstrate mastery of the core concepts and general principles of astronomy.

2. • **PLO 2.**

Conduct experiments and observations with the proper use of equipment for a detailed comparison with physical and astronomical models and theories.

1.4 PROGRAM LEARNING OUTCOME(S) ASSESSED FOR THE ACADEMIC YEAR 2017-2018

The Program Learning Outcome assessed for this one-year period involves one of three major learning goals relevant to physics and astronomy: proficiency in the basic subfields of physics and astronomy, as well as areas of application.

- **PLO 1.**

Demonstrate mastery of the core concepts and general principles of astronomy.

2 METHODOLOGY

2.1 Methodology.

Assessment activities in the Astronomy Minor program were undertaken as planned during the AY 2017-2018, following multiyear departmental guidelines.

2.1.1 Generic Assessment Procedures.

The program learning outcome above was assessed in the following courses: PHYS 121 (Planetary Astronomy) and PHYS 122 (Geometry of the Cosmos). The whole process was organized at the departmental level with cooperation of all the instructors involved, and according to our multiyear departmental guidelines. The data were stored electronically. The faculty members teaching these courses were responsible for the required data collection: Horacio Camblong (PHYS 122) and Xiaosheng Huang (PHYS 121). And the team work was coordinated by Horacio Camblong.

3 Assessment Procedures and Data Analysis.

The relevant learning outcome was assessed by means of direct measures consisting of questions in multiple-choice exams. All of the above consist of questions involving significant knowledge of the core concepts and principles of astronomy that provide the essential ingredients for an effective PLO 1 assessment.

The learning outcomes were gauged with a ternary metric system: above average, average (benchmark standard), and below average. It should be noticed that these are meant to be categories defined by comparison with the benchmark standard, regardless of the statistical

course average for any given class section. This classification refers to the level of mastery of the skill and knowledge set involved in the learning outcome. “Average” is meant to represent a benchmark standard set up to correspond to an overall mastery of the outcome (involving most parts of the assessed problem or question), but allowing for errors or omissions whose correction would otherwise lead to considerable performance improvement. The “above average” mark reflects almost complete command of the relevant skill and knowledge set. The “below average” mark does not necessarily imply failure to perform on the given outcome, but reflects incomplete mastery of the relevant skill and knowledge set, leading to significant gaps in understanding and/or problem-solving outcomes.

For all assessed courses in this cycle, student performance was evaluated on the basis of a representative set of multiple-choice questions. The data were collected and graded by the faculty teaching the courses, and subsequently discussed at two Physics & Astronomy Department meetings.

4 RESULTS & MAJOR FINDINGS

The results for the courses selected for assessment are summarized below:

- PHYS 121 (Planetary Astronomy), Spring 2018: A comprehensive multiple-choice final exam was administered for 77 students. All the questions/problems were selected to be representative of this course material, including the core concepts and general principles of astronomy.

Number of Students: 77;

Above Average: 59 students (77%); Average: 18 students (23%); Below Average: 0 students (0%).

- PHYS 122 (Geometry of the Cosmos), Spring 2018: A multiple-choice final exam was administered for 16 students. All the questions/problems were selected to be representative of this course material, including the core concepts and principles of general relativity (gravitation and spacetime structure) relevant to contemporary astronomy.

Number of Students: 16;

Above Average: 13 students (81%); Average: 3 students (19%); Below Average: 0 students (0%).

5 CLOSING THE LOOP

5.1 Follow-Up Discussion and Decision-Making.

Two Physics & Astronomy faculty meetings addressed various aspects of assessment (February 6th and September 26th, 2018). The discussions included a review of our official assessment plan, the learning outcomes, and the results of this assessment cycle. In addition, follow-up discussions are planned for the ongoing 2018-19 Physics Department meetings.

The following conclusions were drawn:

- All in all, the results of the assessment activities show a relatively high level of performance by most students, with an excellent command of the core concepts and general principles of astronomy, as relevant for the astronomy-minor PLO 1.
- The External Program of the Academic Program Review conducted in Spring 2018 praised our assessment program as follows.

“The overall P&A assessment program is well designed and appears mature. The probes are robust and appropriate, and the reports provided by the department are easy to interpret and contain useful information about student performance. P&A does very good work in many areas and students are a dominant focus in much of that work. . . . The assessment program for P&A is more than sufficient, and it is managed extremely well.”

This is consistent with our own self-evaluation.

- No significant curricular changes are planned/required for AY 2018-19.