



UMass Amherst's Educational Effectiveness Plan (EEP) provides departments with an ongoing structure for conducting systematic inquiry into the effectiveness of their efforts to support student success. Departments initially developed and submitted their EEP inquiry plans and evidence gathering strategies in spring 2018 and are asked to provide updates on their progress on a regular basis. EEP activity is also incorporated into the University's strategic planning process – with departments including their EEP progress and findings into their 2021 Strategic Planning Refresh. What follows is the department's most current reporting, as synthesized by the Office of Academic Planning and Assessment (OAPA).

Astronomy EEP

Identify the evidence you currently use (beyond GPA) to determine that your undergraduates have achieved the objectives you have for them.

We will use grades in the sequence of astrophysics classes (AST 228, 335, and 452) to assess LO1 and LO2. We will use grades in Junior Year Writing (AST 301) and our Integrated Experience course (AST 339) to assess LO3 and LO4. In addition, we will collect samples of the writing from AST 301 and have them reviewed by the Undergraduate Curriculum Committee. We will also have members of the Undergraduate Curriculum Committee sit in on the final presentations in AST 339 to evaluate our students' ability at oral expression. The faculty will review students' senior theses and research write-ups for Advanced Observational Astronomy (AST 341) to evaluate both LO4 and EG1. The faculty will also discuss with the advisors the success of independent research projects. The Department Head, the chair of the Curriculum Committee, and the chief undergraduate advisor will meet with groups of seniors and discuss their undergraduate experience and address all learning objectives.

Please describe the focus of your inquiry and explain why this inquiry is important to your department right now.

Line of Inquiry 2018: We would like to know more about the career paths our students take after graduation and what careers they have 5 years after graduation. This information will inform us whether our curriculum is well suited to the careers our students pursue.

Progress your department has made toward addressing your line of inquiry, and the types of evidence that you have collected to inform your inquiry

We have collected the following evidence: (1) grades for three of our key courses (Astronomy 228, 335, and 452), (2) sample writing assignments from our Junior Year Writing Class, (3) feedback from members of the curriculum committee who attended the final presentations in the IE class (Astronomy 339) last spring, (4) posters produced in Astronomy 341 class and (5) feedback from members of the curriculum committee who attended the senior research presentations last spring.

What are your department's next steps regarding your continuing and/or upcoming EEP line of inquiry?

The Department Curriculum Committee will be meeting during the spring 2020 semester to examine the evidence in more detail and present a report to the entire faculty. We are also considering how to poll our students about our program five years after graduation. By this time the students are more likely to be in more permanent employment and have had some time to reflect on the effectiveness of our program in helping them in their chosen profession.

For graduating senior this spring we plan on gathering contact information so we can reach out to them later and track their progress. We also plan on surveying our graduating seniors either by meeting with them or by a questionnaire. If we plan on a meeting, we like the idea presented in our EEP feedback of using someone outside the department to conduct the conversations to get more candid responses. We also will be providing feedback of our findings to our faculty.

We plan on gathering the same evidence as we gathered this past fall semester for the spring and fall 2020 classes. In spring 2021, based on our activities from the preceding spring semester, we will gather feedback from our graduating seniors about their experience. Maybe at this point we will have contact information for students five years past graduation to get feedback on the appropriateness of our curriculum and its relevance to their chosen career path.

What are the Student Learning Objectives for your department or program(s)?

Astronomy, B.A.

- Understand basic astronomical facts and concepts and apply these to solve problems or form reasoned explanations of phenomena. These basic facts and concepts include an inventory of the various kinds of objects in the universe and their sizes and distances; motions of astronomical objects; the basics of stellar evolution; and the information provided by electromagnetic radiation.
- Apply physics and math to astrophysical problem solving. This includes applications of Newton's laws of mechanics and gravitation, radiation formulas, differentiation and integration, and simple differential equations.
- Develop proficiency with communicating, translating and interpreting fundamental astronomical concepts or research results in oral and written formats.
- Be able to develop science lesson plans or to develop programs for presentations in planetariums or science museums.

Astronomy, B.S.

- Understand basic astronomical facts and concepts and apply these to solve problems or form reasoned explanations of phenomena. These basic facts and concepts include an inventory of the various kinds of objects in the universe and their sizes and distances;

motions of astronomical objects; the basics of stellar evolution; and the information provided by electromagnetic radiation.

- Apply physics and math to astrophysical problem solving. This includes applications of Newton's laws of mechanics and gravitation, radiation formulas, differentiation and integration, and simple differential equations.
- Develop proficiency with communicating, translating and interpreting fundamental astronomical concepts or research results in oral and written formats.
- Be able to apply upper-level physics and computations skills to complex astronomical problems.

Experiential Goals

- The B.S. students should be able to conduct research employing discipline skills related to either observational techniques, instrumentation methods, or software applications used to investigate modern astrophysical phenomena and problems.

Astronomy, Ph.D.

- Demonstrate professional-level ability to understand and use principle findings, common applications, fundamental techniques, and the underlying theories of Astronomy, with an emphasis on developing critical thinking.
- Demonstrate advanced skills necessary to utilize the observational and/or numerical and/or theoretical techniques, instrumentation, computational methods, and software applications used to investigate modern astrophysical phenomena and problems.
- Develop expertise with communicating, translating, and interpreting fundamental astronomical concepts and research results in oral and/or written formats.
- Conduct independent research and acquire mastery-level knowledge of a specific area of the discipline of Astronomy.
- Engage in the scholarly, ethical, and discipline specific practices of the field at a professional level.