

PLAN FOR ASSESSING THE UNDERGRADUATE ASTRONOMY-PHYSICS MAJOR

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Department of Astronomy

Introduction

The Astronomy Department offers courses leading to a B.A. or B.S. degree with the title of Astronomy-Physics. Because of the long history of Astronomy, its effect on the way we look at the physical world, and its continuing vitality, Astronomy affords a good view of the origins of and development of science. Students pursuing degrees in Astronomy want to understand the concepts and models that underlie our current knowledge of the major components of the universe. The undergraduate major in Astronomy has the breadth in scientific and mathematical background of the Physics major, plus a concentration on the nature of physical objects in the universe, such as planets, stars, galaxies, and the universe as a whole. The Astronomy faculty determines the nature of the training in the understanding of the specifically astronomical topics.

The Department of Astronomy's mission is twofold. First, we strive to educate students in science, and secondly to carry out first-rate programs in astronomical education and research. This is complimented by strong service activities in support of the profession, university, and community. The Department's specific educational goals include the training of undergraduate majors in modern Astrophysics. A general goal of the Department is to be one of the most stimulating places in the country to learn about Astronomy.

This plan for assessment is composed of four parts:

- A) A statement of a set of our educational goals
- B) A plan for measuring our success in achieving these goals
- C) A plan for a feedback mechanism whereby changes can be brought to help us reach these goals
- D) A time scale for the implementation of the overall assessment plan

Part A: Educational Goals And Objectives

The overall goal of our major is to educate students about the physical nature of objects in the astronomical universe, give them an understanding of and appreciation for the physical principles that determine structure of the major types of objects in the universe, such as planets, stars, and galaxies, and give them the opportunity to learn how to analyze and interpret data. Astronomy is an observational science as opposed to an experimental one. A key component of our training is to show students the capabilities and limits of observational techniques, and also show how the observational data are converted to information regarding physical properties of astrophysical systems. This we achieve via access to our observatories here in Madison (the roof of Sterling Hall, Pine Bluff Observatory) and elsewhere (the WIYN 0.9m and 3.5m telescopes in Arizona).

Students completing a major in Astronomy should have attained the following:

- a) Give clear a clear explanation of the physical properties of key classes of astronomical objects, and of certain fundamental astrophysical concepts.
- b) Have knowledge of the operation of basic astronomical telescopes and understand the basic techniques for gathering observational material regarding astronomical objects.
- c) Understand the diagnostic methods by which fundamental properties of astronomical objects can be derived from analyses of observational data (i.e. derivation of temperatures and chemical composition of gases in stellar atmospheres or in the gaseous nebulae in galaxies).
- d) Apply concepts learned in Physics, Mathematics, and other sciences to Astronomy by either developing structural models or by interpreting one astronomical object in terms of the properties of another.

Part B: Methods For Assessment

The individual faculty members already have assessments of their instruction through the course evaluations. Summaries of the course evaluations are tracked. This section concerns the assessment of our undergraduate major as a whole.

Each year the chair will appoint an Assessment Committee that will measure the success of our educational program and develop suggestions for change. The committee members will need to recognize that the majors in our department have a range of personal goals. Some intend to go on to graduate school (and possibly not with Astronomy). Some plan to stop at the undergraduate degree and seek employment in the private sector, whether that is in Astronomy or in some other field. What is best for a person intending to become an astronomer might not serve a person intending to start a career in industry. We want our major to serve a wide range of possible career paths, and our assessment plan takes this into consideration.

Exit Interviews: Near the end of each year, each graduating senior will be interviewed by 1-2 faculty members who are chosen in consultation with the student. The interviewer will have a set list of interview questions, as well as a copy of the educational goals for our program which was given to the student at the time they declared their major. We want to revisit the goals to determine whether we have succeeded in accomplishing them, in the eyes of each graduating major

Survey of Undergraduate Alumni: The Assessment Committee will develop and periodically update a "Questionnaire for Undergraduate Assessment". We hope that there will be examples or workshops provided by the College to help us formulate an effective questionnaire. We wish to survey past undergraduates at three-year intervals. By that time they will have a range of experiences that will allow them to recognize what was of value and what was not in regards to their training as an undergraduate Astronomy major.

In addition to the above quality measuring tools, we plan to make use of various types data that already exists. At least once per year, the Assessment and Advising Committee will meet for the purposes of assembling such data. Examples of this are:

- How many majors are involved in research projects in the department?
- How many current majors receive offers from REU (Research Experience for Undergraduates) programs?
- Where are the students obtaining entry for graduate school?
- Are the students being awarded nationally recognized fellowships (e.g. NSF)
- Are students obtaining positions at observatories such as WIYN or SALT or other national and international facilities)?
- Are any students listed as co-authors on papers?
- What are the topics of the students' senior theses?
- Are students gaining employment outside of Astronomy, and what can we do to enhance our program for these students?

Part C: Feedback Mechanism

The Assessment Committee will provide an annual report to the Astronomy faculty. This will include:

- A summary of the assessment methods being used
- A summary of how the Department has achieved its educational goals in respect to the range of objectives of undergraduate majors
- Suggestions for change in the curriculum if they are needed
- Suggestions for change to the goals of the program, if necessary
- Suggestions for change in methods of data collection, if needed

Part D: Implementation Of The Assessment Plan

The first Assessment Committee will be organized in the fall of 2006, with their first task being to develop forms for the exit interview and assemble a list of recent graduates.. The first exit interviews will take place the spring of 2007, and these results will be analyzed shortly thereafter.. The Alumni questionnaires will be distributed once every three years, with each Alum being surveyed just once.