

## **Unit Plan for Assessing and Improving Student Learning in Degree Programs**

Unit: **Department of Atmospheric Science**

Unit Head approval: Dr. Robert Rauber      Date: 5/5/08

### SECTION 1: PAST ASSESSMENT RESULTS

The department has carried out the assessment plans described in the 1999 OAP.

In response to the American Meteorological Society's (AMS) vision statement and demographic surveys (analyzed as part of the 1999 DAS OAP) the department has added a new undergraduate major. Beginning in Fall, 2007, UIUC students have been able to major in Atmospheric Science. This addition has resulted in significant changes in both the graduate and undergraduate curricula. At the undergraduate level, a number of new undergraduate classes have been introduced. For example, previous to the introduction of the major, no 200level classes, and only one 300 level class were taught. The department now offers ATMS 201 (General Meteorology), ATMS 202 (Social Impacts Weather & Climate), ATMS 301 (Atmospheric Thermodynamics), ATMS 302 (Atmospheric Dynamics I), ATMS 303 (Weather Analysis), ATMS 304 (Atmospheric Radiation), and ATMS 305 (Computing and Data Analysis). At the graduate level, classes that were previously 400 level are now offered at the 500 level, and the addition of more 400 level courses for undergraduates and graduates, and more specialized 500 level graduate courses enhance the rigor of both the undergraduate and graduate degrees offered.

The curriculum was also altered in response to graduate feedback. This feedback has generally very positive: graduate surveys suggest that the current outcomes match expectations. Overall, the graduates report that they are very satisfied with their graduate education. They feel that their degree is strongly connected to their subsequent career. They are also very happy with their careers. The graduates also report that the department is successful in meeting its specific education goals (as described in the 1999 OAP). Although survey respondents cited "Mesoscale Meteorology" as their most valued class, a point of concern is course offerings in meteorology – past graduates expressed a desire for more weather related meteorology classes. Several classes have been added to address this concern - ATMS 303 (Weather Analysis), ATMS 403 (Weather Forecasting) and ATMS 404 Mesoscale Meteorology, ATMS 405 (Boundary Layer Meteorology), and ATMS 406 (Tropical Meteorology) are all new courses. Most existing classes will continue to be taught.

Preliminary data has also been received from students beginning the new undergraduate major. Interviews suggest that appropriate post-degree employment is a significant goal of Atmospheric Science students. In addition to ensuring that the undergraduate curriculum follows the AMS course of study recommendations, the department has constructed a new resource (look under "Careers" at <http://www.atmos.uiuc.edu>) that is

the most comprehensive career resource available to the Atmospheric Sciences on the web.

## SECTION 2: REVISED ASSESSMENT PLAN

### (a) PROCESS:

This unit plan is a revised version of the previous, 1999, unit plan. In revising the plan, Dr. Jonathan Tomkin (Associate Director of Academic Affairs) consulted with the head of the Department of Atmospheric Sciences, Dr. Robert Rauber, and Atmospheric Science curriculum committee member Dr. Donna Charlevoix.

### (b) STUDENT OUTCOMES:

*At the B.S. level, our students should possess the following upon graduation:*

1. An understanding of the fundamental science underlying the atmosphere, its weather processes and its climate, including a basic quantitative understanding of atmospheric dynamics, physical meteorology including thermodynamics, radiation and cloud physics, weather processes and forecasting, storm structure and dynamics, and climate.
2. Computational, analytical, and communications skills, an ability to read and listen, to write and speak, to observe and respond critically, to think clearly, critically, and creatively, to think quantitatively and qualitatively, and to develop understanding and attitudes appropriate to a graduate of the University of Illinois.
3. Coursework that follows guidelines recommended by the American Meteorological Society, so that graduates can be successful in finding employment, or in seeking admission to graduate programs.

*At the M.S. level, our students should possess the following upon graduation:*

1. a broad base of knowledge in the Atmospheric Sciences that will allow effective communication with colleagues at a professional level across the disciplines of the Atmospheric Sciences;
2. a sufficient expertise in their chosen area of study so that professional employers and colleagues will recognize and seek their expertise;
3. an appreciation for the interdisciplinary applications of the Atmospheric Sciences and the skills to take advantage of opportunities in this growing sector;
4. a sufficient flexibility in their training so that they can adapt to the changing opportunities presented to them in their careers;
5. an ability to communicate effectively both orally and in writing;
6. superior computing skills across a broad range of platforms and software.

*At the Ph.D. level, our students should possess the following upon graduation:*

1. all of the skills expected of Masters students;
2. the ability to perform novel and independent research;
3. the ability to instruct effectively at the University level.

### **III: Measures and methods**

#### **(c) MEASURES AND METHODS USED TO MEASURE OUTCOMES:**

The department proposes to assess its success in attaining its stated teaching and training goals by using a series of customized survey instruments. It is intended that each instrument be Web-based.

1) *An Undergraduate Exit Survey*. Administered to graduating majors at the time of graduation. This instrument will be used to determine student satisfaction with their academic training and apparent attainment of stated department goals.

2) *A Three-Year Post-graduation Survey for Undergraduates*. The assumption underpinning this survey is that the student is likely to be in a stable career position at this time. In addition, it is assumed that thereafter it will become increasingly difficult to maintain a representative cohort sample.

3) *A Graduate Exit Survey* Administered to graduating masters and doctoral students at the time of graduation. This instrument will be used to determine: student satisfaction with geography training and apparent attainment of stated department goals.

4) *A Three-Year Post-graduation Survey for Graduate Students*. The assumption underpinning this survey is that the student is likely to be in a stable career position at this time.

In addition to measuring student outcomes directly, we will consider student outcome needs by tracking developments in Atmospheric Science industry and academics:

1. *A demographic member survey published by the American Meteorological Society (AMS).*

The AMS is the professional organization of atmospheric scientists, professional meteorologists, and others involved in government, private sector and academic work related to the atmosphere. Contents of the AMS demographic survey include summary data from all universities with Atmospheric Science programs, national employment statistics for the atmospheric sciences, and many other statistics important to our assessment.

2. *The most recent AMS survey of private sector employers*

This survey provides information concerning the skills and qualifications required for private sector employment in the Atmospheric Sciences. For example, the survey

describes typical tasks performed by employees in the private sector, skills required for advancement, and non-meteorological skills that employers consider a plus in a candidate. The survey provides private sector advice to universities on student preparation for employment and contains recommendations concerning curricula.

*3. A survey of the AMS and other employment announcements, including our own jobs posting on the Department Career Website*

The AMS and other organizations publishes monthly employment announcements. We have analyzed these announcements to determine the most important skills and requirements as perceived by potential employers of our students.

*4. A survey of the courses offered by peer universities*

We are comparing our course offerings with those of our peer universities to determine those areas of our academic program that may require stronger emphasis.

*5. A survey of the program requirements of peer universities*

We are comparing our degree requirements with those of peer universities.

### SECTION 3 : PLANS FOR USING RESULTS

#### (a) PLANS:

The results of the above measurements will be summarized annually and provided to the Head of the Department. The Head will then disseminate the information together with the University Senior Surveys and the periodic graduate alumni surveys to the Department's Undergraduate Committee, and Graduate Study Committee. These Committees review their specific programs to seek program improvement based on data collected. The feedback will also be used by the placement coordinator in planning future placement efforts.

Deficiencies identified will be used to propose curriculum changes, and those changes will then be subjected to evaluation as they are implemented.

#### (b) TIMELINE FOR IMPLEMENTATION:

The exit surveys will be developed and administered from the 2008-09 AY onward. A graduate survey has been administered to all recent graduates in 2008; three-year graduate surveys will begin in 2011. Tracking developments in Atmospheric Science industry and academics is an ongoing process conducted by the Head.