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## Proposal to the Senate Educational Policy Committee

**PROPOSAL TITLE:** Change to the requirements for the Undergraduate Major in Atmospheric Sciences

**SPONSOR:** Diane Musumeci, Associate Dean College of Liberal Arts and Sciences, [musumeci@illinois.edu](mailto:musumeci@illinois.edu), 333-6622

**DEPT CONTACT:** Robert M. Rauber, Professor and Head, Department of Atmospheric Sciences, MC-223, 105 S. Gregory St., Urbana, IL 61801, 217-333-2835, [r-rauber@illinois.edu](mailto:r-rauber@illinois.edu)

**BRIEF DESCRIPTION:**

- 1) Add ATMS 307 (Climate and Climate Change, 3 credits) to the required courses for the Atmospheric Sciences Major. (A new course proposal has been submitted for approval). This course will be offered in Spring semesters.
- 2) Change ATMS 492 (Capstone Undergraduate Research, 4 credits) from a required course to an optional course for the Atmospheric Sciences Major.
- 3) Change ATMS 314 (Mesoscale Processes) from a 4 credit course to a 3 credit course.
- 4) Add a 3 hour ATMS elective course requirement

**JUSTIFICATION:**

- 1) Addition of ATMS 307: The study of climate and climate change is fundamental to an education in the Atmospheric Sciences. All major U.S. government agencies conduct and support research in climate, and many public and private sector employment opportunities are related to climate. Climate change is at the center of political debate as our nation and world face the prospect of increasing populations, energy usage and water consumption, and the continued introduction of greenhouse gases into the atmosphere. The American Meteorological Society, the primary professional organization of atmospheric scientists and meteorologists, recommends that all students graduating in our field have a course in climate that includes study of the general circulation of the atmosphere and ocean, regional climates and microclimates, intraseasonal and inter-annual climate variations, long-range weather forecasting, climate data analysis, reconstruction of past climates, climate models, and causes of past and future climate change. At present, we do not require a single course in climate.

We are rectifying that situation with the introduction of this course. The new course will cover these important topics.

- 2) Change requirement of ATMS 492 from mandatory to optional: The Department of Atmospheric Sciences undergraduate major was introduced 2.5 years ago. Our major has grown from 0 to 79 students as of March 10, 2011. Based on Big-10 peer institution's programs in Atmospheric Sciences (at the University of Wisconsin-Madison and Purdue University) we expect to come to equilibrium at about 120 undergraduate majors. We have the potential to grow as large as Penn State or Oklahoma's programs (~250 majors) since, historically, many students at Purdue and Wisconsin were from Chicago, and our program will be financially attractive to future students since we are in-state. Many students graduating from our program go on to graduate school, but many take jobs in the private sector or operational forecasting positions with the government. Some of our students have plans to be secondary school teachers, work in the aviation industry, the military, or even law careers after obtaining a degree in Atmospheric Sciences. Our experience with the Capstone Undergraduate Research course so far has been that it provides great benefits to those students planning to enter graduate school. For students planning other careers, it is largely treated as a requirement to be fulfilled. Our resources are limited (we had no increase in faculty lines with the introduction of our undergraduate program and all of its courses). We have found that our ability to deliver a quality research experience to motivated students has been strained because we have to create and supervise capstone research projects for students who have little interest in the experience. We believe a better solution that will maximize the use of our resources and lead to positive outcomes for students is to offer the Capstone research experience as an optional course. With that change, every student interested in a capstone research experience would have the opportunity, and those that plan to pursue careers not related to research can choose whether or not the experience would benefit them and enroll accordingly.
- 3) Change ATMS 314 credit: ATMS 314, Mesoscale Processes, a required course in our major, was designated as a 4 credit course when originally created at the start of our undergraduate major. The course is taught three days a week for the normal 50 minute class period. The course has no lab. It should be a 3 credit course.
- 4) Add a 3 hour ATMS elective course requirement: In order to keep the number of required Atmospheric Sciences courses to at least 30 hours, we are adding a 3 hour AMTS elective course requirement. This course must be at the 300 or 400-level and chosen from an approved list maintained by the Department of Atmospheric Sciences.

The impact of the changes will be to increase the required total hours for the major from 57-58 to 58-59 and increase the required hours of Atmospheric Sciences courses from 31 to 32 hours.

**BUDGETARY AND STAFF IMPLICATIONS:** *(Please respond to each of the following questions. Place your response right after each item. See Appendix A for additional information.)*

- a. *Additional staff and dollars needed.* **None.**

- b. *Internal reallocations (e.g., change in class size, teaching loads, student-faculty ratio, etc.)* **None**
- c. *Effect on course enrollment in other units and explanations of discussions with representatives of those departments* **None**
- d. *Impact on the University Library (A letter of acknowledgement from the University Librarian must be included for all new program proposals.)* **None**
- e. *Impact on computer use, laboratory use, equipment, etc.* **None**

**DESIRED EFFECTIVE DATE:** August 15, 2011 (Fall semester 2011)

**STATEMENT FOR PROGRAMS OF STUDY CATALOG:**

## **Atmospheric Sciences**

[www.atmos.illinois.edu](http://www.atmos.illinois.edu)

Head of Department: Robert Rauber

Department Office: 101 Atmospheric Sciences Building, 105 South Gregory Street, Urbana, (217) 333-2046

The Science and Letters Curriculum in Atmospheric Sciences prepares students for careers in a wide range of disciplines within the atmospheric sciences including meteorology, environmental science, climate, remote sensing, atmospheric chemistry, computational science and other areas. The curriculum is tailored to achieve the student's long term educational goals, their career aspirations in atmospheric sciences and their general interests in the field. All students receive a firm foundation in mathematics, physics and chemistry and develop data analysis and computational skills that can be used in a wide range of applications within and beyond the atmospheric sciences. Students can emphasize specific areas of interest in their elective choices. Students majoring in Atmospheric Sciences will have opportunities for employment within agencies of government (e.g. the National Weather Service/NOAA, NASA, EPA, DOD, DOE), many private firms and in colleges and universities for those who continue with graduate education. All students take part in independent study, internship or research projects as a capstone experience in their senior year. Students interested in a research career in atmospheric sciences are encouraged to undertake research projects in the capstone experience.

The undergraduate curriculum in atmospheric sciences is modeled on the recently published recommendations of the American Meteorological Society. The American Meteorological Society is the professional society for atmospheric scientists and meteorologists in the United States. Their "recommended attributes" for undergraduate degree programs in the atmospheric sciences are guidelines for graduates to be successful in finding employment or in seeking admission to graduate programs. Therefore, we have closely adhered to these recommended attributes in designing our program.

### **Major in Sciences and Letters Curriculum**

Email: [dept@atmos.uiuc.edu](mailto:dept@atmos.uiuc.edu)

## **Bachelor of Science in Liberal Arts and Sciences**

Minimum required major and supporting course work normally equates to **58-59** hours including at least **32** hours in Atmospheric Sciences.

General education: Students must complete the [Campus General Education](#) requirements.

Minimum hours required for graduation: 120 hours

Departmental distinction: Students majoring in Atmospheric Sciences can earn distinction, high distinction, and highest distinction upon graduation. The requirements for these awards are:

For distinction: A minimum cumulative grade point average of 3.2 in all of their Atmospheric Sciences courses, and completing three Atmospheric Sciences Elective courses.

For high distinction: A minimum cumulative grade point average of 3.4 in all of their Atmospheric Sciences courses, and completing four Atmospheric Sciences Elective courses.

For highest distinction: A minimum cumulative grade point average of 3.6 in all of their Atmospheric Sciences courses, and completing five Atmospheric Sciences Elective courses.

<b>Hours</b>	<b>Requirements</b>
4	PHYS 211 Univ Physics, Mechanics
4	PHYS 212 Univ Physics, Elec & Mag
3	CHEM 102 General Chemistry I
1	CHEM 103 General Chemistry Lab I
4-5	Select one: MATH 220 Calculus or MATH 221 Calculus I
3	MATH 231 Calculus II
4	MATH 241 Calculus III
3	MATH 285 Intro Differential Equations
3	ATMS 201 General Meteorology
3	ATMS 301 Atmospheric Thermodynamics
3	ATMS 302 Atmospheric Dynamics I
4	ATMS 303 Weather Analysis
3	ATMS 304 Atmospheric Radiation
3	ATMS 305 Computing and Data Analysis
<b>3</b>	<b>ATMS 307 Climate Processes</b>

- 4 ATMS 313 Weather Forecasting
- 3 ATMS 314 Mesoscale Processes
- 3 ATMS Electives at the 300- or 400-level selected from an approved course list maintained by the Department of Atmospheric Sciences
- 58-59 Total hours

Table 1: Comparison of major requirements before and after the change

Current requirements		New requirements	
Course	Credits	Course	Credits
PHYS 211	4	PHYS 211	4
PHYS 212	4	PHYS 212	4
CHEM 102	3	CHEM 102	3
CHEM 103	1	CHEM 103	1
MATH 221 or 220	4 or 5	MATH 221 or 220	4 or 5
MATH 231	3	MATH 231	3
MATH 241	4	MATH 241	4
MATH 285	3	MATH 285	3
<b>Subtotal non-ATMS</b>	<b>26-27</b>	<b>Subtotal non-ATMS</b>	<b>26-27</b>
ATMS 201	3	ATMS 201	3
ATMS 301	3	ATMS 301	3
ATMS 302	3	ATMS 302	3
ATMS 303	4	ATMS 303	4
ATMS 304	3	ATMS 304	3
ATMS 305	3	ATMS 305	3
		ATMS 307	3
ATMS 313	4	ATMS 313	4
ATMS 314	4	ATMS 314	3
ATMS 492	4		
		ATMS 3XX or 4XX elective	3
<b>Subtotal ATMS</b>	<b>31</b>	<b>Subtotal ATMS</b>	<b>32</b>
<b>TOTAL</b>	<b>57-58</b>	<b>TOTAL</b>	<b>58-59</b>


# UNDERGRADUATE DEGREE IN ATMOSPHERIC SCIENCES

ELECTIVES IN ATMOSPHERIC SCIENCES AVAILABLE TO  
UNDERGRADUATES TO FULFILL THE 3 HOURS AT THE 300 OR 400 LEVEL  
REQUIREMENT

ATMS 306 Cloud Physics  
ATMS 307 Climate Processes  
ATMS 311 Environmental Issues Today  
ATMS 312 Atmospheric Dynamics II  
ATMS 322 Soc Impacts Weather & Climate  
ATMS 323 Air Pollution to Global Change  
ATMS 391 Topics in Atmospheric Sciences  
ATMS 405 Boundary Layer Processes  
ATMS 406 Tropical Meteorology  
ATMS 410 Radar Remote Sensing  
ATMS 411 Satellite Remote Sensing  
ATMS 420 Atmospheric Chemistry  
ATMS 421 Earth Systems Modeling  
ATMS 425 Air Quality Modeling  
ATMS 444 Arctic Meteorology and Climate  
ATMS 447 Climate Change Assessment  
ATMS 449 Biogeochemical Cycles  
ATMS 468 Optical Remote Sensing  
ATMS 491 Adv Topics in Atmospheric Sci  
ATMS 492 Capstone Undergrad Research

**CLEARANCES:** (Clearances should include signatures and dates of approval) - - These signatures must appear on a separate sheet. If multiple departments or colleges, add lines.)

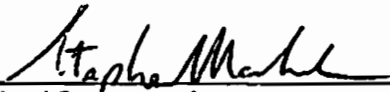
Signatures:



Unit Representative:

3/21/2011


Date:



School Representative:

3/29/2011

Date:



College Representative:

Date:

Provost Representative:

Date:

Educational Policy Committee Representative:

Date:





**Senate Educational Policy Committee  
Proposal Check Sheet**

**PROPOSAL TITLE** (Same as on proposal): Change to the requirements for the Undergraduate Major in Atmospheric Sciences

**PROPOSAL TYPE** (Please select all that apply below):

**A.  Program and degree proposals**

1. This proposal is for a graduate program or degree

Yes  No

2. **Degree** proposal (e.g. B.S.A.E., M.S.C.E.)

New degree — please name the new degree: \_\_\_\_\_

Revision of an existing degree — please name the existing degree to be revised:  
\_\_\_\_\_

3. **Major** proposal (disciplinary focus, e.g., Mathematics)

New major — please name the new major: \_\_\_\_\_

Revision of an existing major — please name the existing major to be revised:  
Atmospheric Sciences

4. **Concentration** proposal (e.g. Financial Planning)

New concentration — please name the new concentration: \_\_\_\_\_

Revision of an existing concentration — please name the existing concentration to be revised: \_\_\_\_\_

5. **Minor** proposal (e.g. Cinema Studies)

New minor — please name the new minor: \_\_\_\_\_

Revision of an existing minor — please name the existing minor to be revised: \_\_\_\_\_

6.  Proposal for renaming an existing degree, major, concentration, or minor

degree       major       concentration       minor

Please provide the current name: \_\_\_\_\_

Please provide the proposed new name: \_\_\_\_\_

7.  Proposal for terminating an existing degree, major, concentration, or minor

Please name the existing degree, major, concentration, or minor: \_\_\_\_\_

8.  Proposal for a multi-institutional degree between Illinois (UIUC) and a foreign institution

Please name the existing Illinois degree or program: \_\_\_\_\_

Please name the partnering institution: \_\_\_\_\_

- B.  Proposal for renaming existing academic units (college, school, department, or program)

Please provide the unit's current name: \_\_\_\_\_

Please provide the unit's proposed new name: \_\_\_\_\_

- C.  Proposal for reorganizing existing units (colleges, schools, departments, or programs)

Change in status of an existing and approved unit (e.g. change from a program to department) — please indicate current unit name including status: \_\_\_\_\_

Transfer an existing unit

Please provide the current unit's name and home: \_\_\_\_\_

Please provide the new home for the unit: \_\_\_\_\_

Merge two or more existing units (e.g., merge department A with department B)

Please provide the name and college of unit one to be merged: \_\_\_\_\_

Please provide the name and college of unit two to be merged: \_\_\_\_\_

Terminate an existing unit — please provide the current unit's name and status: \_\_\_\_\_

- D.  Other educational policy proposals (e.g., academic calendar, grading policies, etc.)

Please indicate the nature of the proposal: \_\_\_\_\_

Office of the Provost and Vice Chancellor  
for Academic Affairs

Swanlund Administration Building  
601 East John Street  
Champaign, IL 61820



August 23, 2011

Gay Miller, Chair  
Senate Committee on Educational Policy  
Office of the Senate  
228 English Building, MC-461

Dear Professor Miller:

Enclosed is a copy of a proposal from the College of Liberal Arts and Sciences to revise the BSLAS in Atmospheric Sciences.

This proposal has been approved by the Committee on Courses and Curricula in the College of Liberal Arts and Sciences. It now requires Senate review.

Sincerely,

A handwritten signature in cursive script that reads "Kristi A. Kuntz".

Kristi A. Kuntz  
Assistant Provost

KAK/njh

Enclosures

c: A. Elli  
S. Leigh  
R. Rauber  
J. Tomkin

UNIVERSITY OF ILLINOIS  
AT URBANA-CHAMPAIGN

Office of the Dean

College of Liberal Arts and Sciences  
294 Lincoln Hall  
702 South Wright Street  
Urbana, IL 61801-3631



August 9, 2011

Kritsi Kuntz  
Assistant Provost  
Swanlund Administration Building  
MC-304

Dear Kristi:

The Committee on Courses and Curricula, Dean's Cabinet, and Executive Committee on behalf of the Faculty of the College of Liberal Arts and Sciences has voted to approve the following proposal:

**Revision to the BSLAS in Atmospheric Sciences**

Please address all correspondence concerning this proposal to me.

Sincerely,

A handwritten signature in black ink, appearing to read 'Steven R. Leigh'.

Steven R. Leigh  
Associate Dean

enclosure

C: Professor Robert Rauber  
Dr. Jonathan Tomkin