

APPROVED BY SENATE

05/02/2016

ILLINOIS
UNIVERSITY OF ILLINOIS AT URBANA CHAMPAIGN

Proposal to the Senate Educational Policy Committee

PROPOSAL TITLE: Proposal to revise the BSLAS in Atmospheric Sciences, in the Department of Atmospheric Sciences, College of Liberal Arts and Sciences

SPONSOR: Robert M. Rauber, Professor and Head, Department of Atmospheric Sciences 217-333-2835, r-rauber@illinois.edu

COLLEGE CONTACT: Karen Carney, Associate Dean, College of Liberal Arts and Sciences, 333-1350, kmcarney@illinois.edu

BRIEF DESCRIPTION: The current degree requirements for a B.S.LAS in Atmospheric Sciences do not include a course in cloud physics, a topic that concerns the processes of precipitation formation in clouds. In light of the importance of precipitation worldwide, it is imperative that the future generation of atmospheric scientists receives specific and high-level instruction in the topic of cloud physics. Thus, we propose to add a current elective, ATMS 306, Cloud Physics, as a degree requirement for a B.S.LAS in Atmospheric Sciences. ATMS 306 will replace the current requirement of a 3-hour ATMS Elective at the 300 or 400-level, implying that the total number of required ATMS credits will remain unchanged.

JUSTIFICATION: In the atmospheric sciences, “cloud physics” refers to the aggregate processes of precipitation formation in clouds. This explicitly includes: (i) the formation of cloud droplets from microscopic aerosol particles in the air; (ii) some means of combining these droplets to form rain drops or frozen precipitation such as snow or hail; (iii) the subsequent growth of the precipitation within rising and sinking air currents in the cloud; and (iv) the ultimate descent of the precipitation to the ground. Each of these processes involve lengths, times, and motions that span several orders of magnitudes. Because of their inherent complexities, the cloud and precipitation processes are represented indirectly, i.e., “parameterized” in weather forecast models. Such parameterizations are a major source of error in the forecast models; an over- (or under-) estimate of snowfall during a winter storm, or of rainfall during a summer storm, is a common occurrence that has wide-ranging practical and societal implications. Uncertainties associated with the parameterization of cloud and precipitation processes in climate models have led in turn to uncertainties in projections both of precipitation and temperature in future globally warmed climates. Weather-radar and satellite technologies have recently become available to allow for better observations of cloud physics and thus reduction of these uncertainties. Indeed, the recent “dual-polarization” upgrade of the U.S. network of Doppler radars (NEXRAD) is providing information used routinely by weather forecasters for enhanced warnings of flooding and related hazards.

We desire to provide our students with specific and high-level instruction in cloud physics so that they can become better equipped to solve weather and climate problems, and otherwise understand how to optimize the use of current and emerging technologies for precipitation forecast and warning applications. Although such instruction is already in existence (ATMS 306), it is not a required part of the degree. We feel it is of sufficient importance, and now have sufficient faculty, to include ATMS 306 as a requirement. The Department of Atmospheric Sciences (DAS) is recognized as a world leader in cloud physics research, and in fact, with two recent faculty hires, we now have five faculty members with some form of cloud-physics expertise within DAS. We propose to exploit this expertise and make our students uniquely qualified for future professions in the atmospheric sciences.

The American Meteorological Society now recommends that students in undergraduate programs have a course in cloud physics as part of the requirements for recognition as a meteorologist. In addition, a course in cloud physics satisfies the physics education requirement for employment as a meteorologist in the U.S. government. Thus, by requiring this course as part of our major, we ensure that all of our students carry these qualifications into their careers.

To summarize, we propose to add a current elective, ATMS 306, Cloud Physics, as a degree requirement for a B.S.LAS in Atmospheric Sciences. As noted in Appendix A, ATMS 306 will replace the current requirement of a 3-hour "ATMS Elective at the 300 or 400-level", implying that the total number of required ATMS credits will remain unchanged.

BUDGETARY AND STAFF IMPLICATIONS: *(Please respond to each of the following questions.)*

1) Resources

- a. How does the unit intend to financially support this proposal?

There are no financial consequences of this change. ATMS 306 is offered every year currently.

- b. How will the unit create capacity or surplus to appropriately resource this program? If applicable, what functions or programs will the unit no longer support to create capacity?

There is no need to create capacity.

- c. Will the unit need to seek campus or other external resources? If so, please provide a summary of the sources and an indication of the approved support.

No external resources are required.

- d. Please provide a letter of acknowledgment from the college that outlines the financial arrangements for the proposed program.

There are no financial arrangements required.

2) Resource Implications

- a. Please address the impact on faculty resources including the changes in numbers of faculty, class size, teaching loads, student-faculty ratios, etc.

There are no impacts on faculty resources. The course mentioned is already offered annually.

- b. Please address the impact on course enrollment in other units and provide an explanation of discussions with representatives of those units. (*A letter of acknowledgement from units impacted should be included.*)

There are no impacts on course enrollments in other units.

- c. Please address the impact on the University Library (*A letter of estimated impact from the University Librarian must be included for all new program proposals. If the impact is above and beyond normal library business practices, describe provisions for how this will be resourced.*)

There are no impacts on the University Library.

- d. Please address the impact on technology and space (e.g. computer use, laboratory use, equipment, etc.)

There are no impacts on technology and space.

DESIRED EFFECTIVE DATE: Fall 2016

STATEMENT FOR PROGRAMS OF STUDY CATALOG:

For the Degree of Bachelor of Science in Liberal Arts and Sciences

Major in Sciences and Letters Curriculum

Email: dept@atmos.uiuc.edu

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.

PHYS 211	University Physics: Mechanics	4
PHYS 212	University Physics: Elec & Mag	4
CHEM 102	General Chemistry I	3
CHEM 103	General Chemistry Lab I	1
MATH 220	Calculus	4-5
or MATH 221	Calculus I	
MATH 231	Calculus II	3
MATH 241	Calculus III	4
MATH 285	Intro Differential Equations	3
ATMS 201	General Physical Meteorology	3
ATMS 301	Atmospheric Thermodynamics	3
ATMS 302	Atmospheric Dynamics I	3
ATMS 303	Synoptic-Dynamic Wea Analysis	4
ATMS 304	Radiative Transfer-Remote Sens	3
ATMS 305	Computing and Data Analysis	3
ATMS 306	Cloud Physics	3
ATMS 307	Climate Processes	3
ATMS 313	Synoptic Weather Forecasting	4
ATMS 314	Mesoscale Dynamics	3
ATMS Electives at the 300 or 400-level selected from an approved course list maintained by the Department of Atmospheric Sciences		3
Total Hours		58-
		59

CLEARANCES: (Clearances should include signatures and dates of approval. These signatures must appear on a separate sheet. If multiple departments or colleges are sponsoring the proposal, please add the appropriate signature lines below.)

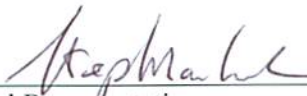
Signatures:



Unit Representative:

3/2/2016

Date:



School Representative:

3/4/16

Date



College Representative:

3-15-16

Date:

Appendix A:
Comparative Table of Proposed Changes

UG Programs:

Current Hours	Department Major Requirements	Proposed Hours	Proposed Requirements
4	PHYS 211	4	PHYS 211
4	PHYS 212	4	PHYS 212
3	CHEM 102	3	CHEM 102
1	CHEM 103	1	CHEM 103
4 (5)	MATH 221 (or 220)	4 (5)	MATH 221 (or 220)
3	MATH 231	3	MATH 231
4	MATH 241	4	MATH 241
3	MATH 285	3	MATH 285
3	ATMS 201	3	ATMS 201
3	ATMS 301	3	ATMS 301
3	ATMS 302	3	ATMS 302
4	ATMS 303	4	ATMS 303
3	ATMS 304	3	ATMS 304
3	ATMS 305	3	ATMS 305
3	ATMS 307	3	ATMS 307
4	ATMS 313	4	ATMS 313
3	ATMS 314	3	ATMS 314
3	ATMS Elective	3	ATMS 306
58 (59)	Total required in major	58 (59)	Total required in major

Current Hours	Current Requirements	Proposed Hours	Proposed Requirements
30	General education	30	General education
58 (59)	Major requirements	58 (59)	Major requirements
35	Electives	35	Electives

UNIVERSITY OF ILLINOIS
AT URBANA-CHAMPAIGN

EP.16.68

Office of the Provost and Vice Chancellor
for Academic Affairs

Swanlund Administration Building
601 East John Street
Champaign, IL 61820



March 29, 2016

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

Dear Professor Francis:

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

Sincerely,

A handwritten signature in cursive script that reads 'Kathryn A. Martensen'.

Kathryn A. Martensen
Assistant Provost

Enclosures

c: K. Carney
A. Elli
R. Rauber
S. Marshak

UNIVERSITY OF ILLINOIS
AT URBANA-CHAMPAIGN

College of Liberal Arts and Sciences
Office of the Dean

2090 Lincoln Hall
702 S. Wright Street, MC-448
Urbana, IL 61801



March 18, 2016

Kathryn Martensen
Associate Provost
Office of the Provost and Vice Chancellor for Academic Affairs
207 Swanlund Administration Building
MC-304

Dear Kathy:

On behalf of the Faculty of the College of Liberal Arts and Sciences I administratively approve the following proposal:

Revision to the BSLAS in Atmospheric Sciences

This proposed revision does not alter the required hours. Please address all questions on this request to me.

Sincerely,



Karen M. Carney
Associate Dean

enclosure

C: Professor Robert Rauber
Professor Stephen Marshak