**UNIVERSITY FACULTY SENATE FORMS**

**Academic Program Approval**

This form is a routing document for the approval of new and revised academic programs. Proposing department should complete this form. For more information, call the Faculty Senate Office at 831-2921.

**Submitted by:** *Tracy DeLiberty* phone number: *x4084*

**Department:** *Geography* email address: *tracyd@udel.edu*

**Date:** *1 September 2013*

**Action:** *Add Ph.D. in Climatology*

(Example: add major/minor/concentration, delete major/minor/concentration, revise major/minor/concentration, academic unit name change, request for permanent status, policy change, etc.)

**Effective term:** *14S*

(use format 04F, 05W)

**Current degree:**

(Example: BA, BACH, BACJ, HBA, EDD, MA, MBA, etc.)

**Proposed change leads to the degree of:**

(Example: BA, BACH, BACJ, HBA, EDD, MA, MBA, etc.)

**Proposed name:** *Ph.D. in Climatology*

Proposed new name for revised or new major / minor / concentration / academic unit

 (if applicable)

**Revising or Deleting:**

**Undergraduate major / Concentration:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

 (Example: Applied Music – Instrumental degree BMAS)

**Undergraduate minor:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

(Example: African Studies, Business Administration, English, Leadership, etc.)

**Graduate Program Policy statement change:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

(**Must attach** your Graduate Program Policy Statement)

 **Graduate Program of Study:** *Geography Ph.D. with Concentration in Climatology*

(Example: Animal Science: MS Animal Science: PHD Economics: MA Economics: PHD)

 **Graduate minor / concentration: remove concentrations**

**Note: all graduate studies proposals must include an electronic copy of the Graduate Program Policy Document, highlighting the changes made to the original policy document.**

**List new courses required for the new or revised curriculum. How do they support the overall program objectives of the major/minor/concentrations)?**

 (Be aware that approval of the curriculum is dependent upon these courses successfully passing through the Course Challenge list. If there are no new courses enter “None”)

None

**Explain, when appropriate, how this new/revised curriculum supports the 10 goals of undergraduate education:** [**http://www.ugs.udel.edu/gened/**](http://www.ugs.udel.edu/gened/)

**Identify other units affected by the proposed changes:**

(Attach permission from the affected units. If no other unit is affected, enter “None”)

The College of Earth, Ocean, and Environment is affected by the proposed Climatology Ph.D. with asking participation of interested faculty. A letter of support is attached from the Director of the School of Marine Science and Policy and the Dean of the College of Earth, Ocean, and Environment.

**Describe the rationale for the proposed program change(s):**

(Explain your reasons for creating, revising, or deleting the curriculum or program.)

The Ph.D. program proposed is new only in an administrative sense. This proposal seeks to replace the current concentration in Climatology of the Geography Ph.D. That concentration, in turn, came into existence in 2008 as a revision of an earlier Ph.D. in Climatology that was housed entirely in the Geography Department. A separate, contingent proposal from the Geography Department covers the changes in concentrations of the Geography Ph.D.

Since the mid 1980s, the Geography Department of the University of Delaware has produced over 40 Ph.D. graduates in Climatology or Geography with a Climatology concentration. That program was built on a preceding decade of graduate education at the master’s level, also focused on climatology. The original mission reflected the visions of our department's four climate-oriented faculty members at the time (around energy-budget, water-budget, synoptic and applied climatology), and focused on atmospheric effects at the land surface. This program began at a time when climatology was considered variously a subfield of geography or of meteorology, and it was not a field widely known outside of academia and agricultural extension services.

Public awareness of climate has grown well beyond the imagination of those who entered the field just a few decades ago. Questions about climate change and its causes and implications are among the central environmental questions of our time. Climate change drives the research agendas of a large fraction of all scientists who have a primary interest in climate, earth, oceanic, and environmental sciences. Since its cause is inextricably linked to energy policy and it has effects across the gamut of human activity, it is a central issue for a wide range of geographers, social scientists, policy specialists, and economists. We have reached a level of awareness wherein questions about climate change and related policy arise in debates among candidates for President of the United States. Reports of the National Academy of Sciences and the Intergovernmental Panel on Climate Change have regularly reaffirmed that this is a topic of great and ongoing concern.

The Climatology program within the Geography Department has also changed since its inception, as must any program that hopes to stay current with a research Ph.D. Technological changes have given us greater access to a wider variety of data sources, numerical models, and analysis techniques, such that less time is spent on the “background” or “overhead” aspects of research. As we have expanded as a department, revisions were made in 2008 to allow greater interaction between the climatologists within the department and those who focused more on land surface or hydrological processes, reflecting the importance of such boundary conditions on climatic understanding. We remain an active program, with four Ph.D.s granted in the past two years, leading to three assistant professorships and a postdoc at a DOE national lab.

Three years ago, as part of the environmental initiatives associated with the University’s Path to Prominence, the Department of Geography joined with the Department of Geological Sciences and the School of Marine Science and Policy to form a new College of Earth, Ocean, and Environment. Now we would like to reconfigure the Climatology Ph.D. program to make better use of the opportunities afforded by this new college. We propose returning the Ph.D. in Climatology to its pre-2008 status as an independent Ph.D. program, while also opening it to a wider group of faculty. The program would continue to be administered by the Geography Department, but would now be considered a college-wide program, allowing full faculty participation by any member of the College of Earth, Ocean, and Environment. This change would keep the existing faculty resources within the Geography Department and would make the program more suitable for use by members of the School of Marine Science and Policy, within which many projects already contain some element of atmospheric science.

Many of the questions regarding initiation of a new program are obviated by the current existence of the Geography Ph.D. concentration in Climatology. We have a program that currently receives good applicants, graduates and places good students, and contributes to the research missions of our College and University. Rather than being a truly new program, we see this initiative as the latest evolution of a successful program of Ph.D. education that granted its first degree in 1986 and should continue for decades to come.

A full proposal is attached that provides a description of the program, enrollments, program requirements, and resources available.

**Program Requirements:**

(Show the new or revised curriculum as it should appear in the Course Catalog. If this is a revision, be sure to indicate the changes being made to the current curriculum and **include a side-by-side comparison** of the credit distribution before and after the proposed change.)

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| **Requirements for the PhD Degree in Climatology**Applicants to the PhD program concentrations in Climatology or Land-Surface Processes are expected to have completed a master's degree in geography, geology, climatology, meteorology, or another related discipline. Students in these concentrations must also have completed mathematics through ordinary differential equations and must demonstrate a knowledge of at least one higher level computer programming language. PhD students are expected to obtain an in-depth knowledge of two areas. One of these must be topical, such as bioclimatology, physical climatology and land-surface processes urban climatology, or climate dynamics for the Climatology concentration, or land-surface measurement, surface process analysis, biogeochemistry, or geomorphology for the Land-Surface Processes concentration. The other area must be methodological such as statistical methods, mathematical modeling, or geographic information science.Students are also expected to demonstrate a high level of professional competence by passing a written qualifying examination, an oral examination and an oral dissertation defense. More description of the PhD program can be obtained by contacting the Geography Department.  | **Requirements for the PhD Degree in Climatology**Applicants to the Ph.D. program in climatology are expected to have completed a master’s degree in geography, geology, atmospheric science oceanography, environmental science, or meteorology, but students from other sciences, engineering, and the social sciences are encourage to apply. Admission will be judged on the basis of both the quality and the range of their education. Requirements of specific mathematical background (calculus through ordinary differential equations) and of computer analysis and programming skills will be required prior to admission, whereas deficiencies in the topical core may be taken care of by course work during the degree program. Through the Ph.D. program, students are expected to acquire general knowledge of climatology, including physics of climatology (thermodynamics, radiation, and cloud processes), atmospheric dynamics (forces and flows), measurement (microclimatological methods and instrumentation, remote sensing) and computational methods for data analysis and synthesis. Students are also expected to obtain specialized knowledge in two areas, one of which is topical (covering the specific research area) and the other being in technical methods. Typical technical methods include graduate course work in statistics, mathematics, computer science, or related sciences that are relevant to the area of research of the dissertation. Students must demonstrate a high level of professional competence in climatology by passing a written qualifying examination, an oral examination and an oral dissertation defense. A description of the Ph.D. program in climatology can be obtained from the CEOE homepage or by contacting the Geography Department. |

 **ROUTING AND AUTHORIZATION:** (Please do not remove supporting documentation.)

Department Chairperson  \_\_\_\_\_\_\_ Date 1 September 2013\_

Dean of College Date

Chairperson, College Curriculum Committee\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Chairperson, Senate Com. on UG or GR Studies Date

Chairperson, Senate Coordinating Com. Date

Secretary, Faculty Senate Date

Date of Senate Resolution Date to be Effective

Registrar Program Code Date

Vice Provost for Academic Affairs & International Programs Date

Provost Date

Board of Trustee Notification Date

Revised 02/09/2009 /khs

Dr. Mark A. Moline

Director

Hugh R. Sharp Campus

700 Pilottown Road

Lewes, DE 19958

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October 1, 2013

University of Delaware

Faculty Senate Committee

011E Hullihen Hall

Newark, DE 19716

Dear Members of the University Faculty Senate Committee:

On behalf of The School of Marine Science and Policy, I am pleased to support the application for a new Ph.D. program in Climatology.

Our School will support this new interdisciplinary Ph.D. program in a number of ways. Our faculty will be encouraged to participate in this program, including serving on the Graduate Program Committee, participating as Program Faculty, functioning as Primary or Secondary Faculty Advisor, and offering core and/or elective courses in the course curriculum. Furthermore, interest from both Marine Sciences and Policy students within the School makes this a timely degree for providing highly qualified students to the program.

This is a great opportunity for the University of Delaware and we look forward to the collaboration this new program offers.

Sincerely,

Mark A. Moline

Director, School of Marine Science and Policy





October 16, 2013

University of Delaware

Faculty Senate Committee

011E Hullihen Hall

Newark, DE 19716

Dear Members of the University Faculty Senate Committee:

On behalf of The College of Earth, Ocean, and Environment, I am pleased to support the request for an independent Ph.D. degree in Climatology, which will replace the existing concentration in Climatology of the Geography Ph.D. Indeed, this is really a request for a reinstatement of a very successful degree that was offered in Geography until 2008. At that time the department was required to choose between a more general degree that could accommodate the entire department and one that was considered

more specialized. It was a false dichotomy, one that forced the department to give up a highly successful and visible degree program. In the intervening time, faculty strength in this area has grown to include individuals not only in Geography but also in the School of Marine Science and Policy.

The new degree will be administered by the Department of Geography but the program itself will be considered college‐wide, and will allow for full faculty participation and advisement of students by any faculty member within the College of Earth, Ocean, and Environment.

The benefit of making this a college‐wide program is that the existing faculty resources within the Geography Department can continue to be leveraged, while allowing the program itself to also be supported and utilized by others in the College, especially those in the School of Marine Science and Policy. As you may know, the College already has multiple jointly appointed faculty members between these two units, particularly focused in the area of climate and atmospheric science. As such, the number of research projects and courses being co‐sponsored in these areas is growing. This independent degree reinforces our strengths in this area.

Specifically, the Department of Geography and School of Marine Science and Policy will jointly support this college‐wide degree in the following ways:

 Faculty will serve on program committees

 Faculty will serve as advisors for students in the program

 Faculty will teach both core and elective courses for the program



Faculty Senate Committee

October 16, 2013

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This is a great opportunity for the University and the College of Earth, Ocean, and Environment and I thank you in advance for your consideration of this initiative.

Sincerely,

Nancy Targett

Dean, College of Earth, Ocean, and Environment