SPECIAL REPORT

of the

ACADEMIC PRIORITIES, GRADUATE AND
PROGRAM AND BUDGET COUNCILS

concerning a

GRADUATE CERTIFICATE IN CLIMATE CHANGE, HAZARDS AND
GREEN INFRASTRUCTURE

Presented at the
747th Regular Meeting of the Faculty Senate
April 9, 2015

COUNCIL MEMBERSHIP

ACADEMIC PRIORITIES COUNCIL

Richard Bogartz (Chair), Nicholas Bromell, Javier Campos, Elizabeth Chilton, W. Curt Conner, Suzanne Daly, Kathleen Debevec, Piper Gaubatz, Bryan Harvey, Masoud Hashemi, A Yemisi Jimoh, Nancy Lamb, Ernest May, Katherine Newman, Deborah Picking, Monroe Rabin, James Rinderle, Barbara Stanley, Scott Stangroom

GRADUATE COUNCIL


PROGRAM AND BUDGET COUNCIL

ACADEMIC PRIORITIES COUNCIL

At the December 18, 2014 meeting of the Academic Priorities Council, the APC voted to endorse the revised LARP proposal for a Graduate Certificate in Climate Change, Hazards and Green Infrastructure.

GRADUATE COUNCIL

The Academic Standards and Curriculum Committee (ASCC) of the Graduate Council met on March 4, 2015 and reviewed the proposal for a Certificate in Climate Change, Hazards and Green Infrastructure. The ASCC recommended this proposal for approval.

On Wednesday, March 11, 2015, the Graduate Council approved the Certificate in Climate Change, Hazards and Green Infrastructure.

PROGRAM AND BUDGET COUNCIL

This proposal is a replacement for the previous submission (not approved) titled “Certificate in Climate Change and Green Infrastructure.” It responds to the emerging need for professionals trained in how to improve the ecological performance and resilience of urban areas. It uses both in-person and on-line courses and requires 15 credits (2 required courses and 3 electives).

There are no additional resources needed. All courses are already offered or are extensions of existing on-line offerings.

At its meeting on February 18, 2015, the Program and Budget Council unanimously approved the Graduate Certificate in Climate Change, Hazards and Green Infrastructure, submitted as proposal #1556 on the Course and Curriculum Management System.

MOVED: That the Faculty Senate approve the Graduate Certificate in Climate Change, Hazards and Green Infrastructure, as presented in Sen. Doc. No. 15-042.
Briefly describe the certificate.

There is an emerging need for professionals trained in how to improve the ecological performance and resilience of urban areas. This is a particular issue at the site, local, and regional level, where choices in infrastructure and spatial form can support lower fossil fuel use and better hazard resilience, or they can build in inefficiency and risk to the long-term form of communities. These multiple pressing goals -- reducing greenhouse gas emissions, increasing resilience to natural hazards and climate change effects, and providing more green infrastructure to achieve these goals and provide current quality-of-life benefits -- in urban areas can be mutually supportive if designed well, but can conflict if designed badly. Emerging professionals will benefit from advanced training in climate-informed municipal planning and regulation, and expertise in the area of what is called ‘green infrastructure’ -- stormwater management systems, urban heat island reductions, low-fossil-fuel transport systems -- that work with and support natural processes. The Department of Landscape Architecture and Regional Planning has developed an expertise in both distinct fields of climate change and hazards planning and in green infrastructure, and is unusual in its ability to bring these two highly related but often differentiated areas of planning and design together. Landscape architecture works at the site level and designs appropriate systems to support new building; planning provides the public process and strategic outlook as well as regulatory framework within which new development occurs. Geography has significant coursework in Climate and Hazards that provide strong theoretical background on the topic. This proposal brings these together in a targeted certificate designed as a professional supplement to an graduate degree in LARP, geography, public policy, civil engineering, green building, architecture, or related fields.

The proposed certificate utilizes a blended pedagogy, including both in-person and on-line courses. It is appropriate for 5-College and non-degree students interested in this specialty area. Completing the certificate will provide a professional advantage to students in the job market for positions in sustainable design and planning. Courses are concentrated into two semesters -- spring and summer -- so that students can more readily complete the certificate. There will be a few elective offerings in fall and winter to increase flexibility. We anticipate that with advance planning students could complete the certificate in just one summer beyond their existing coursework, using electives from their primary program for some credits and then taking additional credits during the summer to complete the certificate. Other students may require a spring semester and a summer semester in addition to their regular curricula. Some students may not be enrolled in a degree program; in this case, it will take one spring semester and one summer to complete the classes. Students will apply to the certificate by emailing the coordinator their cv/resume and a brief statement of interest, and undertaking an in-person or distance-interview regarding existing knowledge and goals.

Provide a brief overview of the process for developing this certificate.

This proposal was considered by the Faculty Senate’s Academic Priorities Council in October, 2014, as a combined graduate/undergraduate certificate. In response to review comments, we have adjusted the proposal so that this is graduate-only.

This certificate was developed in coordination between Professor Robert Ryan (Landscape Architecture) and Elisabeth Hamin (Regional Planning), with close consultation with Piper Gaubatz (Geography). Ryan and Hamin are members of the Sustainability Studies group on campus, and have coordinated to assure that our certificate supports others that are proposed. For example, LARP is supporting a proposal that should be coming to the Faculty Senate this year for an undergraduate certificate in Five College Sustainability Studies (FCSS). The FCSS is different from our proposal in that it is much more general and not particularly oriented to a professional skill-building, and is restricted to undergraduates. There is also the new Masters Degree in Sustainability Sciences, but it does not have a climate or infrastructure focus. Our proposal thus fills a gap in current and proposed masters degrees and certificates. Drafts of the certificate proposal have been shared with the UMass Sustainability Working Group, with the Environmental Conservation Department, the Architecture program, Engineering, and the Geosciences Department and Geography program, along with their relevant Deans.
Describe the certificate’s purpose and the particular knowledge and skills that will be acquired by participating students.

Purpose: To provide advanced professional knowledge and skill building around planning and design to address climate change and green infrastructure.

Core Knowledge and Skills:
• Basic comprehension of climate change processes (refresher information included in Planning for Climate Change, more extensive coverage for those who need it is through Geography courses).
• Familiarity with the theories of resilience and sustainability in the urban environment
• Understanding the multiple-objectives of green infrastructure planning and design including water quality and quantity management, biodiversity, transportation, and recreational resources.
• Comprehension of planning processes and best practices for municipalities and regions to improve the resilience of urban infrastructure
• Ability to plan and design green infrastructure networks across multiple spatial scales (i.e., site, local, and regional).
• Awareness of equity implications of hazard vulnerability and infrastructure or policy choices

Specialized Knowledge and Skills available through Electives
• Municipal greenhouse gas accounting, climate action plan preparation, and best practices to encourage reduction of greenhouse gas emissions at the local level.
• Municipal climate adaptation planning best practices to improve resilience to current and future climate variability.
• Mapping strategies and geographic information systems modeling to investigate vulnerability to hazards and future climate
• Advanced knowledge of the performance and monitoring of green infrastructure
• Specialized knowledge in applying and implementing green infrastructure as a natural hazard planning tool.
• Interactions of social and cultural structures with community design and resilience to hazards.

If this proposal requires no additional resources, say so and briefly explain why. If this proposal requires additional resources, explain how they will be paid for. For proposals involving instruction, indicate how many new enrollments are expected and whether the courses have room to accommodate them.

This certificate program requires no new resources, as all of the listed classes are already offered.

We anticipate that this will serve a small number of students. Our target is 10 students a year, a number which can be easily accommodated in existing class sections.

Please describe the curriculum for this certificate, listing all required courses and possible electives, any prerequisites or GPA requirements, the recommended order or coursework and any other pertinent information. You may attach additional materials related to the curriculum at the end of this section.

Required courses
RegionPl 658 Climate Change and Cities Spring
LandArch 591I Green Infrastructure Spring

Electives
RegionPl 591X Climate Adaptation for Urban Areas Summer/on-line
RegionPl 591P Low-Carbon Cities Summer/on-line
RegionPl 625 Geographic Information Systems Spring in-person or Summer/on-line
LandArch 582 Green Urbanism Spring
LandArch 591K Advanced Topics in Green Infrastructure Performance and Monitoring Spring
LandArch593F Study Tour in Europe (up to 3 credits) Spring/Summer
RegionPl 580 Sustainable Cities Seminar Spring
NRC 578 Watershed Science and Management Spring
Geo-Sci 510 Natural Hazards Summer/on-line
Geo 658 Paleoclimatology varies
Geo 654 Problems in Climatology varies
Electives in hydrology, geosciences, and social processes as approved by Certificate Advisor.

GPA requirement: 3.0 average in major courses for matriculating students or special permission of advisor. No prerequisites, although students without a background in ecology/climate will be directed to appropriate elective courses to assure a solid intellectual foundation.

Course order: The two core classes should be taken first, but the electives can be scheduled to suit the student.

**Explain how these courses represent a coherent course of study.**

The unifying theme is the intersection of climate change hazards and the built form. The two core courses assure that students will have a sound background in these issues. There are two further courses in climate change (RegPlng 591X, 591P), and two further courses in green infrastructure or green/sustainable urbanism (LandArch 591K, 593F) from which students can choose. In addition, there are appropriate electives to assure that students have strong methods (GIS, Watershed modeling, Climatology), and courses in hazards and sustainability to support those with these interests. Together this provides a strong core knowledge and the ability to go very deep into the topic of the certificate.

**Describe how there is a clear educational objective that can be achieved in an efficient and well-defined manner.**

The educational objective is essentially skill building and professional development, allowing students to identify themselves to industry or government as having a sound understanding of the emerging issues of climate and green infrastructure planning. Grouping classes in spring and summer on-line allows students to be very efficient in completing the certificate.

**Explain how the course sequence offers a clear objective at the appropriate educational level.**

All of the listed courses are at the 500- or 600-level, and thus appropriate for a graduate certificate.

**Describe the perceived need for this certificate.**

Students are seeking proof of technical skills to help stand out from other graduates as they seek employment after graduation. The certificate guides students to a coherent and strong curriculum, and then allows them to indicate to the market they are highly qualified in this growing professional need.

There are a lot of jobs in this growing area. A quick search on LinkedIn finds about 14,500 jobs posted for ‘Climate Change’ and another 1,500 for ‘Green Infrastructure.’ New York City, for instance, has an entire department of Green Infrastructure and is currently hiring a GI manager. Certification will help students get hired into these jobs.

**If the courses that comprise the certificate have been or currently are being offered, describe their schedule of availability. If the certificate if comprised of new courses, describe their planned activity.**

All of the listed courses are being offered this year, with the following exceptions: The Geography courses on Paleoclimatology and Problems in Climatology class are offered more irregularly. The GIS class has not made enrollment in the summer CPE sessions so far, but with enrollment through this certificate, it could run. The GIS class is offered each spring in-person, so it is still available even if the summer on-line version doesn’t run.
If the certificate requires or includes courses from outside the sponsoring department, provide evidence of agreement(s) with the unit(s) offering those courses. You may attach any memoranda of understanding below.

The certificate includes classes from Geography, as well as one class each from NRC and Geosciences.

What type of student is allowed to participate in this certificate program? (e.g., matriculated UMass students, non-matriculated CPE students, Five College students, graduate students, students in a specific degree program, etc.)

Matriculated students, Five College students, graduate students, non-matriculated CPE students.

What role will this certificate plan in relation to other departments or degree programs on campus? Certificates vary widely across campus and may represent a subset of an existing degree program, a multidisciplinary program, or an entirely free-standing area of focus.

This certificate bridges the two disciplines in the Landscape Architecture and Regional Planning department. It is thus related to our existing department, but also free-standing.

Is this a transitional certificate program?

No.
Checksheet for Graduate Certificate in Climate Change, Hazards and Green Infrastructure

Student Name:

Current UMass or other program or non-matriculating:

Undergraduate degree:

Undergraduate GPA:

Other highly relevant work experience:

Year certificate program begun:

Science/ ecology/ climate background:

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<tr>
<th>Course number</th>
<th>Course name</th>
<th>When taken?</th>
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<tr>
<td>RegionPl 658</td>
<td>Climate Change and Cities</td>
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<td><strong>Electives</strong></td>
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<td>Climate Adaptation for Urban Areas</td>
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<td>Performance and Monitoring</td>
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<td>LandArch 593F</td>
<td>Study Tour in Europe (up to 3 credits)</td>
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