

## Brothers, Sheila C

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**From:** Schroeder, Margaret <m.mohr@uky.edu>  
**Sent:** Wednesday, January 28, 2015 11:22 AM  
**To:** Brothers, Sheila C; Hippisley, Andrew R  
**Subject:** Graduate Certificate in Digital Mapping  
**Attachments:** DigitalMappingGraduateCertificate-FINAL.pdf

### Graduate Certificate in Digital Mapping

This is a recommendation that the University Senate approve the establishment of a new Graduate Certificate in Digital Mapping in the Department of Geography within the College of Arts & Sciences.

Please find the updated version of the proposal attached here.

Please let me know if you need anything else.

Best-  
Margaret

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Margaret J. Mohr-Schroeder, PhD | Associate Professor of Mathematics Education | [STEM PLUS Program Co-Chair](#)  
| [Department of STEM Education](#) | [University of Kentucky](#) | [www.margaretmohrschroeder.com](#)



**UK**  
UNIVERSITY OF  
**KENTUCKY**

College of Arts and Sciences

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OFFICE OF THE  
SENATE COUNCIL

November 11, 2014

Richard Schein, Chair  
Department of Geography  
University of Kentucky  
Lexington, KY

Dear Rich,

I am writing to express my enthusiastic support for the new, fully on-line M.S. Degree and Graduate Certificate in New Maps Plus that you and the New Maps advisory board and Geography department faculty have been working to develop over the past 18 months. The College of Arts and Sciences is very excited to sponsor this pioneering degree that will give practicing professionals the opportunity to extend their skills in the analysis and visualization of geographic data through an innovative online curriculum. The College fully intends to provide the resources needed to make this degree program, and the affiliated graduate certificate, successful.

The College of Arts & Sciences is well equipped to satisfy this need with a faculty who have achieved a superb record in research and publication, and in designing and teaching courses in digital mapping at the graduate and undergraduate level. Master's degree candidates will benefit from instruction by a nationally-prominent faculty. Their study will be well-rounded as well as focused, and candidates will receive a wide range of academic and professional training through this online curriculum. The curriculum provides extensive experience with technical training in Geographic Information Systems (GIS) and online mapping, including the creation and use of geodata, as well as online spatial visualization tools.

The proposed Master's degree and Graduate Certificate in New Maps Plus will afford interested individuals from across the nation the opportunity to pursue advanced study in complex mapping projects, and will train working professionals in a range of web-based systems for producing online geovisualizations and applications - areas in which our faculty have established national reputations. The University of Kentucky Geography department is a leading center for studies in critical GIS and public participatory cartography and analysis. Having a graduate program in digital mapping will position UK as an innovator in this area,



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providing an educational opportunity for citizens of the Commonwealth of Kentucky and elsewhere.

No additional faculty are needed to implement the certificate and Master's degree in New Maps Plus. Nonetheless, the College is open to the future possibility of additional hires in this general area, if enrollments so demand. In other ways, the resources required to run the program are already in place. The faculty needed to run the program and to teach its courses already exist, and the courses have been developed and are under review by university committees. Recruitment and publicity for these new programs will be handled centrally by Hive.

I appreciate the diligence and effort that you and the Program Faculty expended to achieve the goal of an innovative, fully online graduate certificate and Master's degree for the College. I look forward to seeing this important program established at the University of Kentucky.

Sincerely,

A handwritten signature in black ink, appearing to read 'MLK', written in a cursive style.

Mark Lawrence Kornbluh  
Dean

cc: Ted Schatzki, Associate Dean of Faculty  
Betty Lorch, Associate Dean of Research and Graduate Studies  
Anna Bosch, Associate Dean of Undergraduate Programs  
Kirsten Turner, Chief Financial Officer/Chief of Staff



**Department of Geography**

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October 6, 2014

Educational Policy Committee  
College of Arts and Sciences  
University of Kentucky

Dear Colleagues,

Please be assured that the New Maps+ Certificate proposal submitted by Professor Matthew Zook and now before you has received full Geography Department faculty approval according to our department bylaws and the Geography Department has the resources to support the Certificate without impacting core program resources.

Sincerely Yours,

A handwritten signature in blue ink, appearing to read 'RHS', written over a light blue horizontal line.

Richard H. Schein  
Professor and Chair

# Proposal for a Graduate Certificate in Digital Mapping

## 1. General Information

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**Certificate Home:** Department of Geography

**Certificate Name:** Digital Mapping

**Requested Effective Date:** 8/15/2015 or Fall 2015

**CIP Code:** 45.0702, Geographic Information Science and Cartography

## 2. Proposal Contact

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Dr. Matthew Zook

Professor

859-218-0955

[zook@uky.edu](mailto:zook@uky.edu)

## 3. Overview

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Note: the formal name for this proposal is a “Graduate Certificate in Digital Mapping”. The term NewMaps+ is also used in this proposal in reference to the larger initiative that has been ongoing in the Geography department since 2011 and includes both this graduate certificate as well as a Master’s degree.

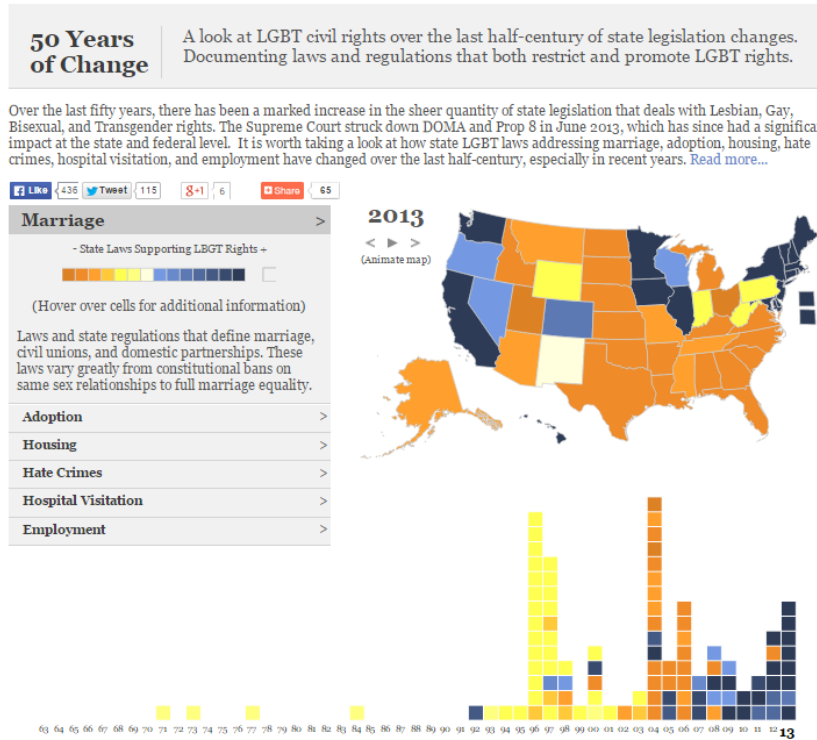
### A. Description

The online graduate certificate in digital mapping (11 credits in three courses) trains students in a range of web-based systems for producing online geovisualizations and applications. Information about location and spatial analysis has become ubiquitous in everyday life and central to an array of disciplines ranging from soil science to public health to the digital humanities and demand for geospatial technology expertise is burgeoning. Location-aware devices (such as smart phones) have saturated everyday life and present enormous opportunities for online mapping tools and analysis in applications ranging from smart-city and civic development to human-environmental relations to increasing demands for “big data” analytics.

The graduate certificate in digital mapping is part of a larger initiative (referred to as NewMaps+) to provide a curriculum rich with technical training in Geographic Information Systems (GIS) and online mapping including the creation and use of geodata, cutting edge techniques for scraping geodata from social media and other web-based sources, as well as online spatial visualization tools such as TileMill and D3. The New Maps+ initiative challenges students to critically engage with potential pitfalls of online mapping such as locational privacy and changing technical standards. The University of Kentucky is well positioned with instructional assets in critical GIS and online mapping as well as strong ties to academic and industrial networks enabling the New Maps+ graduate certificate to serve an emerging market in online education in GIS and mapping amid an unfolding location-aware future.

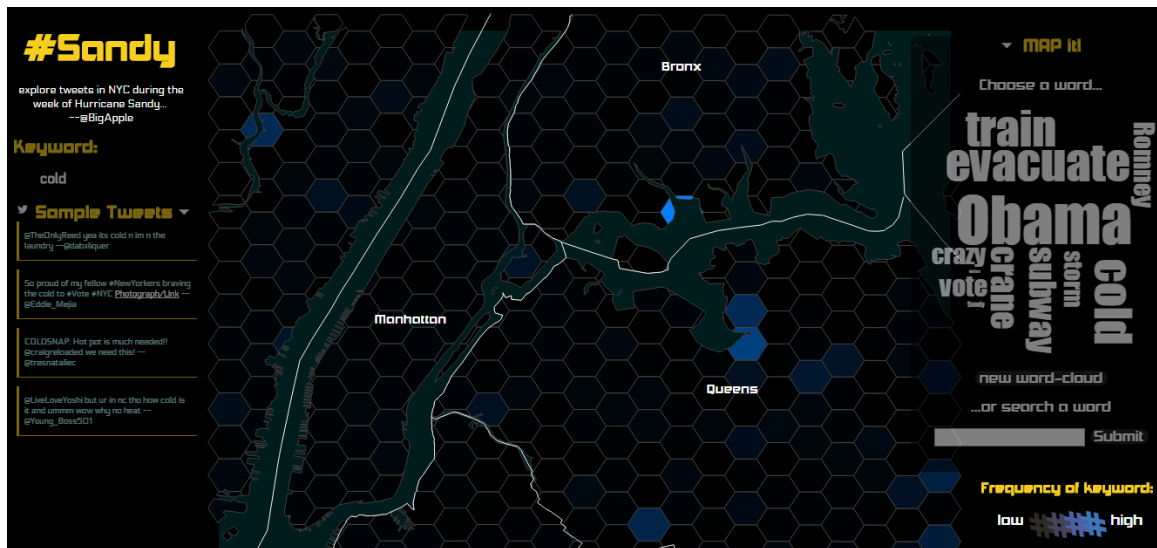
To get a sense of the kind of mapping project that students will be able to produce as a result of the program, please see the following two maps. Both of these maps were created by students and are the result of similar course work as proposed for this certificate. We expect our students will be creating more advanced products than these relatively simply examples.

### 50 Years of Change: An Animated Map Looking at Changing Legislation Related to LGBT Rights at the State Level



Source: <http://50yearsofchange.com/>

### #Sandy: An Interactive Map of Tweets During Hurricane Sandy Visualized via WordClouds and Hex Maps



Source: <http://www.geo-odyssey.com/links/sandy/>

In order to establish the New Maps+ initiative in digital mapping, the Department of Geography is moving forward on several simultaneous fronts, including this graduate certificate. These include:

- This proposal to the UK Faculty Senate for a new graduate certificate (11 credits);
- A proposal to the UK Faculty Senate for a new Master's of Science degree (30 credits);
- Ten new graduate course proposals submitted to the UK Faculty Senate for classes taught within the graduate certificate and Master's degree; and
- A proposal to the Council of Post-Secondary Education for the Master's degree under a different but closely related CIP code (45.0702, Geographic Information Science and Cartography) to the currently existing CIP code (45.0701) associated with graduate studies in Geography.

All courses for the graduate certificate will be offered entirely online and take advantage of the latest online instruction technologies to provide video lectures, discussion and assignments.

These new courses and certificate will not replace existing offerings and all courses, certificates and degrees currently associated with Geography will remain.

All resources (faculty, courses, computer equipment, etc.) necessary for running the certificate is based in the Geography department. As this is an online graduate certificate, no classroom space resources are needed. We do have the necessary computer lab, server and infrastructural resources needed for NewMaps+.

#### B. Affiliation

This certificate is affiliated with the Department of Geography.

The Department of Geography has been focused on expanding its curriculum in geographic information systems (GIS) and digital mappings since 2010 when it conducted a nationwide search and hired two faculty members -- Dr. Jeremy Crampton (GIS, critical cartography) and Dr. Matthew Wilson (GIS, public participation) who joined the department in the Fall of 2011. They joined existing faculty members – Dr. Matthew Zook (online mapping, geosocial media), Dr. Daehyun Kim (spatial analysis) and Dr. Liang Liang (remote sensing) – and have established the department as a leading center for studies in critical GIS and public participatory cartography and analysis. In August 2014, Dr. Rich Donahue, an expert in online mapping pedagogy, joined the department in a post-doc position to work on the NewMaps+ initiative. As part of this effort the New Mappings Collaboratory (<http://newmaps.as.uky.edu/>) was established to jointly work on research and teaching efforts involving online mapping and critical GIS.

Towards this goal the Geography department and New Mappings Collaboratory hosted a workshop event during May 2013 in which a dozen of the leading educators in the field of digital mapping were brought to UK campus and engaged in a week-long intense curriculum development process. This initial curriculum building process was supported by funding from the Dean of the College of Arts and Sciences as well as the Department of Geography. Building upon this foundation Dr. Matthew Zook led a proposal writing process in response to a call for proposals from the University of Kentucky eLearning Innovation Initiative (eLII), a joint effort of the Office of the Provost, UK Analytics and Technologies (AT) and the Center for the Enhancement of Learning and Teaching (CELT). The proposal was awarded a grant of \$200,000 in January 2014 (see <http://www.uky.edu/elii/onlinedegreeprogram/awardees>) and course design efforts began in earnest.

### C. Demand

Geographic data and its analysis and visualization are increasingly prevalent in the global economy and the range and power of online mapping tools is expanding. The enormous range of commercial uses for geographical data means that geospatial technology market is growing at 35 percent per year overall while the commercial market is increasing by 100 percent annually.<sup>1</sup> The U.S. Department of Labor further notes that, “the widespread availability of advanced technologies offer great job opportunities for people with many different talents and educational backgrounds.”<sup>2</sup> Thus, the New Maps+ graduate certificate is positioned within a growth sector of the economy and we anticipate considerable demand for both the graduate certificate and the Master's degree.

Indeed a number of universities have also seen this demand and offer a range of initiatives. A survey by the Geography department and information from Geotechnologies expert Dr. Chris Lukinbeal (University of Arizona) identified benchmark initiatives at other universities offering certificates and Master's degrees in GIS: Penn State University (PSU), Denver, Northwest Missouri, USC, UW, American Sentinel (a for-profit in Denver), and Delta State in Mississippi. This review highlights the range of definitions of online programs. While some (such as PSU) are fully online,

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<sup>1</sup> US Department of Labor. (2012). High growth industry profile – Geospatial technology. Retrieved on December 15, 2012 from [http://www.doleta.gov/brg/indprof/geospatial\\_profile.cfm](http://www.doleta.gov/brg/indprof/geospatial_profile.cfm)

<sup>2</sup> US Department of Labor. (2012). High growth industry profile – Geospatial technology. Retrieved on December 15, 2012 from [http://www.doleta.gov/brg/indprof/geospatial\\_profile.cfm](http://www.doleta.gov/brg/indprof/geospatial_profile.cfm)



other initiative have an in person component (such as one week when students are expected to be on campus or some other location together). (2) Universities with certificate initiatives generally allow certificate credits to count for a Master's degree if the student chooses to continue. Our understanding is that much of the demand (and revenue) is generated via the certificate rather than Master's initiatives. (3) There is considerable demand for these initiatives. The largest online initiative, Penn State, has 800 students in the initiative at any given time, mostly enrolled in the certificate. USC has about 180 students in a cohort, while the smaller initiatives have cohorts of approximately 30 students.

D. Demographics of Target Student Population

The target population for graduate certificate is expected to be working adults who wish to pursue a course in digital mapping and value the flexibility that an online course provides. We anticipate students coming from the traditional backgrounds using mapping, *e.g.*, urban planning and transportation but also see great opportunities for students coming from business and marketing, journalism, design fields as well as the non-profit sector. As maps and spatial information become ever more integrated into daily life demand for digital mapping skillsets will increase in the commonwealth, nation and world. Given the online nature of the graduate certificate we expect enrolled students to come from every part of the country and world.

In addition we expect these courses to be of interest to current University of Kentucky graduate and postbac students. Our courses would be open to these traditional students although subject to the prerequisite requirements of each course and the guidelines of the student's home departments.

Given the background of our expected students (working adults) we have designed a course structure of ten weeks rather than the traditional semester system. This has a number of key advantages including the ability for students to start taking classes in the graduate certificate at four different times. We anticipate this to be very useful to students who lives are not organized around a two semester system and should better serve them. See below for a review of how this will be structured.

E. Projected Enrollment

The certificate is designed so that students can complete it within one year. Therefore our anticipated enrollment figures in the graduate certificate are only for new students that year rather than continuing ones.

Year 1	20 to 60 new students
Year 2	35 to 75 new students (50 to 135 total students)
Year 3	40 to 80 new students (90 to 215 total students)

F. Distance Learning

This certificate will be taught completely online. There are a total of three courses in the certificate and are detailed below in the curriculum section.

The New Maps+ Design Strategy aims for the highest quality student learning experience and is fundamentally predicated upon quality interaction with the instructor. We are concerned with the careful and best use of educational technologies requiring

instructors to embrace the disruptive promise of online teaching rather than simply mirroring offline approaches. Often this has meant a distilling of the substantive learning objectives of face-to-face interaction, as opposed to thinking through the transformative moment in the face-to-face classroom, which is part substance and part process. Many online courses only focus on the substance of learning, at the expense of the processual. The unfolding of a process of learning in face-to-face moments is not easily or directly transferable into the online course, and we see this as perhaps the most impactful challenge at the center of the proposal. To address this we outline specific steps to ensure that the quality of our online instruction is equal to or exceeds face-to-face interaction.

Since the Spring 2013 semester the Geography department has intensely reviewed instructional and online mapping technologies in order to build successful online mapping courses. A particularly central technology is the learning management system (LMS) and we have select Canvas for the New Maps+ graduate certificate. We choose Canvas as a LMS for a range of reasons. We also have experimented with feature set of Canvas, particularly assessment engines and grading, and are satisfied that they meet the needs of the New Maps+ certificate.

We anticipate using multiple technologies for direct communications with students but plan to primarily use Canvas given the advantages of a centralized LMS. This would include notifying students of course events via their preferred method of contact. We are still evaluating our preferred technologies for live meetings (such as synchronous final project charrettes). While U.K. offers Adobe Connect, we also value technologies more widely used by our potential students. In particular, the conferencing system offered by Google Hangout is versatile and has the advantage of being tied to the larger Google suite of software.

Another decision that remains unresolved is the technology for peer evaluation as the Canvas LMS seems limited in this arena. Our prior experience with online peer learning indicates that key issues are: (1) sharing materials among course participants and (2) collecting and aggregating peer feedback and evaluation. A unique challenge to the New Maps+ initiative is that project material is often in the form of visualizations rather than text or numeric answers to problem sets. We have found workable solutions by combining a shared blog (with each student sharing their map) with commenting (for general feedback and commentary) and free online survey systems (for collecting more sensitive, grade related evaluations).

Our strategy for ensuring instructional quality in the New Maps+ graduate certificate is closely tied to our strategic vision for high quality student learning environments and the specific steps we will take to ensure that the quality of our online instruction. We see flexibility in course design, openness in learning from previous experience, experimentation with both technologies and pedagogy and attentiveness to what works as fundamental aspects of high quality online instruction and instructors. We believe that the instructional quality of the New Maps+ graduate certificate will also draw upon the compelling and evocative nature of our learning content. To ensure this, we leverage our existing networks at the interface of design and mapping to draw professionals to interact with our instruction and our students. We believe that both the learning content and the pedagogical strategies associated with 'mapping' are shifting. Maintaining the pulse as well as the contours of these changes will allow us to adapt quickly and best serve our

learning audience, who we expect to be highly dynamic participants in our graduate certificate.

#### 4. Administration and Resources

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##### A. Administration

All administrative functions will be done by the Department of Geography in concert with relevant UK departments, e.g., we will work with the Graduate School's admissions process.

##### B. Resources

All resources (faculty, courses, computer equipment, etc.) necessary for running this graduate certificate are based in the Geography department. As this is an online graduate certificate, no classroom space resources are needed. We do have the necessary computer lab, server and infrastructural resources needed for NewMaps+.

##### C. Faculty of Record / Graduate Certificate Associates or Affiliates

The NewMaps+ graduate certificate will be governed by a committee of three faculty of record (inclusive of the Graduate Certificate Director) who will serve two year terms and will be appointed by the Chair of Geography in consultation with the committee. The committee members will be drawn from Geography department faculty whose teaching and research directly engage the focus of the New Maps+ certificate who will be appointed by the Chair of Geography to act as the Faculty of Record for this graduate certificate. In addition to topical expertise many faculty have experience in designing and delivering online and hybrid course design and there presently is a working group dedicated to those goals. The New Maps+ graduate certificate will draw upon the following Geography faculty:

Dr. Jeremy Crampton is a key figure in the GIS & Society movement as well as critical cartography. He is developing an open-mapping research program at UK and has begun working with hybrid models of GIS courses to provide more flexibility for students.

Dr. Daehyun Kim is a biogeographer researching the spatial patterns of vegetation and landform via simulation models, geographic information systems and spatial/multivariate statistics in order to analyze and visualize dynamics of complex biogeographic systems.

Dr. Liang Liang researches bioclimatology and explores the timing of life cycle events such as bud burst and flower bloom via remote sensing and geographic information systems.

Dr. Matthew Wilson is an expert on public participation GIS and has designed a number of new U.K. courses including GEO109: Digital Mapping and the GEO509 Workshop on collaborative mapping using online technologies. He is also a key figure in disciplinary discussions on the transitioning of traditional GIS courses to online environments.

Dr. Matthew Zook won U.K. Provost Teaching Award in 2013 and researches geographically referenced social media data to study the spatial patterns of society. He founded the popular geovisualization blog, FloatingSheep (featured in the Economist, CNN, BBC World Service, and WIRED Magazine) and has developed new course on web scraping and visualization.

The Geography Department Working Group for online and hybrid courses presently is working with HIVE and CELT to transition key Geography courses to more on-line based content and instruction, and includes faculty with experience and expertise in on-line teaching as well as substantive research expertise which might be utilized for course modules empirically dedicated to specific topics; including political ecology, urban studies, social theory and cultural landscapes. The working group includes Dr. Lynn Phillips, Dr. Tad Mutersbaugh, Dr. Richard Schein and Dr. Alice Turkington.

D. Graduate Certificate Director

The proposed graduate certificate director is Dr. Matthew Zook who is heading this certificate proposal.

## **5. Support and Impact**

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A. Faculty Governance

Please see the attached letter from Dr. Richard Schein, Chair of Geography verifying that 1) the NewMaps+ graduate certificate has received faculty approval through faculty governance procedures and 2) the department has the resources to support the certificate without impacting core program resources.

B. Other Related programs

There are no other UK programs officially involved in this graduate certificate. But the Geography department also has strong collaborative relationships with a range of other departments and colleges at U.K. engaged in GIS and mapping which could take advantage of this graduate certificate. These include Agriculture, Civil Engineering, Digital Humanities, Earth and Environmental Systems, Historic Preservation, Fine Arts, History, the Kentucky Transportation Center and Landscape Architecture.

C. External Course Utilization

There are no external courses used in the graduate certificate.

## **6. Admissions Criteria and Curriculum Structure**

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A. Admissions Criteria

The NewMaps+ graduate certificate will follow standard Graduate School requirements for admission to a graduate certificate.

There are no requirements that students need to be enrolled in a UK Master's or Ph.D. degree and award of the NewMaps+ graduate certificate does not guarantee admission to the Master's in digital mapping also proposed by the Geography department or any other degree at the University of Kentucky.

Students seeking to be admitted to the NewMaps+ graduate certificate must contact the certificate Director.

In order to receive the certificate, students must have a minimum GPA of 3.0 in the three courses that form the certificate.

B. Curricular Structure

This course will not use existing course but consists of three new courses using the MAP<sup>3</sup> prefix.

The graduate certificate component consists of three courses (11 credits). These courses are required to be taken in order and are designed to provide students with the necessary technical skills in GIS, programming and design to succeed in digital mapping.

Prefix	Number	Title	Prereq	Credits
MAP	671	Introduction to New Mapping	-	3
MAP	672	Programming for Web Mapping	671	4
MAP	673	Design for Interactive Web Mapping	672	4

### C. Course structures

The NewMaps+ graduate certificate is designed around a length of ten weeks rather than the traditional 16 week semester and given the compressed time schedule the course work (both in class time and assignments) is much more intensive in order to provide the same level of instruction. For example, a course is three credits and will consist of a total of 4 hours of in class time (via the Canvas LMS) and assignment work that will take an average student about 12 hours to complete (see table below).

In class time could consist of video lectures (approximately 1.5 to 2.5 hours per week), written instructions/lectures and exercises (approximately 1.5 to 2 hours per week) and class discussion/group troubleshooting around specific topics (approximately 1 to 1.5 hours per week). The exact distribution depends upon the topic and learning objectives for the course.

### **Comparison of ten week course structure to 16-week semester courses**

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<sup>3</sup> The Department of Geography is seeking the MAP prefix as part of its proposed online graduate certificate. The MAP prefix would provide a couple of key advantages – emphasis and differentiation -- as we move forward with this NewMaps+ initiative. First, the MAP prefix emphasizes a mapping focus of the courses vis-à-vis other fields of study within Geography. Second, the MAP prefix will provide a useful means of differentiating between this new graduate certificate (which will be entirely online) and our existing graduate degrees. Moreover as part of the new initiative and MAP prefix we are also seeking a new CIP code (45.0702, Geographic Information Science and Cartography) which contrasts with the existing CIP code (45.0701) associated with Geography. We will have different sets of admissions criteria and learning objectives for the NewMaps+ initiative and the MAP prefix will help us organized this. We have received confirmation from David Timoney, Associate Registrar for Communications at the University of Kentucky that the MAP prefix is currently available.

	<b>3-Credit Semester Course</b>	<b>4-Credit Semester Course</b>	<b>2-Credit Intensive 10 Week Course</b>	<b>3-Credit Intensive 10 Week Course</b>	<b>4-Credit Intensive 10 Week Course</b>
Credits	3	4	2	3	4
Weeks	16	16	10	10	10

<b>IN CLASS TIME</b>					
Total in class time (hours)	40.00	53.33	26.67	40.00	53.33
Total in class time per week (hrs/wk)	2.50	3.33	2.67	4.00	5.33
<b>OUT of CLASS TIME (Estimated 3 hours for every in class hour)</b>					
Total out of class time (hours)	120.00	160.00	80.00	120.00	160.00
Total out of class time per week (hrs/wk)	7.50	10.00	8.00	12.00	16.00
<b>TOTAL CLASS TIME</b>					
Total class time (hours)	160.00	213.33	106.67	160.00	213.33
Total class time per week (hrs/wk)	10.00	13.33	10.67	16.00	21.33

Note: This table uses the metric of 800 minutes (13.33 hours) of in class time per credit per semester. Thus, a three credit semester long course meets for 150 mins per week.

#### D. Yearly Schedule

In order to design an initiative around ten week courses we have devised an alternative yearly schedule consisting of four ten week course periods and four breaks of two to six weeks. This ensures that courses can be regularly offered and also provides time for revising and updating course material during the break periods. It also provides the means to construct a steady and controlled roll-out of courses so that prerequisites are offered on an ongoing and regular basis. The graduate certificate will follow the graduate school rule (when applicable) regarding student enrollment in consecutive semesters, leaves of absences and readmission.

The schedule also overlaps at key moments with the existing academic calendar, most notably, our proposed Fall session is complete within the Fall semester and our proposed Winter session is within the Spring semester. This would make it possible for regular University of Kentucky graduate students to enroll in courses.

The start time of courses depends up the approval process but we have outlined a proposed calendar below based on approval for a start in the Fall 2015 semester. This will be amended as necessary but will adhere to the following scheduling rules.

- The exact dates of the four course periods and four breaks will be fixed to the yearly schedule of the University of Kentucky.
- More specifically, the start of the ten week Winter session will be the Monday following the start of the official Spring semester of the University of Kentucky.
- The starting dates for the remaining three course periods (each ten weeks long) will be adjusted by varying the length of the break periods (between two and six weeks) as necessary to conform to UK registrar requirements.
- Credit for courses will be assigned (e.g., appear on transcripts) to regular UK semesters and summer sessions as determined by the registrar.

We have met with David Timoney of the Registrar's Office and he has confirmed that this calendar can work with UK systems.

		Wks	671 Intro	672 Program ming	673 Design	674 Spatial Analysis	675 Collabor ative GeoViz	701 History	719 Seminar	698 Final Proj Prep.	699 Final Proj. Implem.
Fall Session	10/4/2015 to 12/12/2015	10	Week1   Week10								
Winter Break	12/13/2015 to 1/16/2016	5									
Winter Session	1/17/2016 to 3/26/2016	10	Week1   Week10	Week1   Week10				Week1   Week10			
Spring Break	3/27/2016 to 4/9/2016	2									
Spring Session	4/10/2016 to 6/18/2016	10	Week1   Week10	Week1   Week10	Week1   Week10				Week1   Week10		
Summer Break	6/19/2016 to 7/9/2016	3									
Summer Session	7/10/2016 to 9/17/2016	10	Week1   Week10	Week1   Week10	Week1   Week10	Week1   Week10		Week1   Week10			
Fall Break	9/18/2016 to 10/1/2016	2									
Fall Session	10/2/2016 to 12/10/2016	10	Week1   Week10	Week1   Week10			Week1   Week10		Week1   Week10		
Winter Break	12/11/2016 to 1/21/2017	6									
Winter Session	1/21/2017 to 4/1/2017	10	Week1   Week10	Week1   Week10	Week1   Week10	Week1   Week10		Week1   Week10		Students begin final projects after completing all required courses.	

## 7. Assessment

### A. Student Learning Outcomes

These learning objections for the graduate certificate are:

- Identify the appropriate applications of different forms of geospatial data, analytical techniques and mapping software platforms.
- Gather, integrate, transform and analyze geospatial data from multiple sources.
- Create static and interactive maps and visualizations in accordance with prevailing and rigorous cartographic standards.

- Develop basic web-based programs and scripts utilizing web standards to enhance user interaction with maps.
- Identify and implement appropriate applications of design components to maximize the usability of maps.
- Construct a publicly-available online portfolio of data, code, maps and accompanying explanations on an online sharing platform such as Github.

#### B. Student Learning Outcome Assessment

Our plan is to develop and integrate assessments instruments throughout the courses to provide students with ongoing feedback and to provide faculty with metrics on student comprehension to target specific interventions into course content and instructional technology improvement. For example, we will mandate that 2-3 short assessments/quizzes (primarily evaluated algorithmically) be included throughout the course of each of 15 to 20 teaching modules that make up a course to provide regular checks on learning and feedback for students. We will also integrate longer labs/tests (evaluated both algorithmically and by instructors/TAs using rubrics) at the completion of each module with a final project at the end of each course (primarily evaluated by instructors/TAs using rubrics).

A key part of the certificate is having students construct a public portfolio of maps, data, code and accompanying text that will be housed on a public website (GitHub). These portfolios will be used to assess student learning and as a means of professionalization. These portfolios will help students in seeking employment, serve to showcase the New Maps+ certificate, and also provide a public system to assess the technical skills gained by our students.

#### C. Certificate Outcome Assessment

In addition to the specific assessments built into each course, we will also develop certificate evaluation and assessment. The assessment will be built around the learning objectives for the graduate certificate as outlined in this proposal. The specific ways of measuring these objectives will be decided during the development and operation of the courses. Our plan is prepare two basic type of deliverables for the certificate assessment including (1) quantitative data for selected assignments in courses that reflect certificate goals and (2) artifact collection from courses, likely final projects that will be most reflective of certificate objectives. Both types of deliverables will be drawn from the LMS Canvas which we will be using for this graduate certificate.

In addition to the two deliverables outlined above we also plan to assess the career outcomes of certificate earners through regular contact with our alumni. Logistically this will be done via online social network systems (e.g., LinkedIn, Twitter) but also through in-house databases of basic contact information (email, phone, twitter handles) that will be used to formally and informally survey alumni about 1) their current career and salaries; 2) the ties between courses and subsequent work tasks; and 3) input on additions or changes to the course material. This alumni networking should also prove useful for helping more recent graduates establish themselves in the field.



**Ellis, Janie**

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**From:** Nikou, Roshan  
**Sent:** Wednesday, November 26, 2014 10:23 AM  
**To:** Brothers, Sheila C; Carvalho, Susan E; Ellis, Janie; Ett, Joanie M; Hippisley, Andrew R; Jackson, Brian A; Lindsay, Jim D.; Nikou, Roshan; Price, Cleo; Timoney, David M  
**Cc:** Schein, Richard H; Zook, Matthew A; Vaillancourt, Lisa J; Lauersdorf, Mark R; Tanaka, Keiko; Perkins, Andrea L; Erwin, Heather; Badurdeen, Fazleena F; Buntin, William J; Huber, Jeffrey T  
**Subject:** GC Transmittals  
**Attachments:** MS in MAP-signed.pdf; GC in MAP-signed.pdf; Plant Pathology Dual Degree-signed.pdf

TO: Andrew Hippisley, Chair and Sheila Brothers, Coordinator  
Senate Council

FROM: Brian Jackson, Chair and Roshan Nikou, Coordinator  
Graduate Council

Graduate Council approved the following proposals and is now forwarding them to the Senate Council to approve. All the courses listed below have been forwarded to the Senate Council via e-Cats.

**Programs and Certificates (attached)**

Plant Pathology Dual Doctoral Degree (**this is not a new program and does not involve modifications to requirements for an existing degree**)

Masters in Digital Mapping (**There are 10 MAP courses related to the Masters in Digital Mapping; I am sending 5 of them with this transmittal and will send the remaining 5 as soon as they get the GC's approval**)

Graduate Certificate in Digital Mapping

**Courses (on e-Cats)**

LIN 629 Advanced Historical Linguistics

LIN 695 Directed Studies in Linguistics

SOC 781 Quantitative Data Analysis II

ME 799 Mechanical Engineering Graduate Seminar

CPH 763 Ethics for Public Health

MAP 674 Spatial Data Analysis and Visualization  
MAP 675 Collaborative Geovizualization  
MAP 695 Special Topics in Mapping  
MAP 701 History of Critical Cartography  
MAP 719 Social Impacts in New Mapping  
KHP 601 Teaching Effectiveness and Leadership in KHP  
KHP 602 Promoting Physical Activity for Youth  
MFS 606 Seminar and Project in Manufacturing System  
ICT 600 Information in Society

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