

Memorandum To: University of Louisville Faculty Senate

From: Associate Dean Deborah Keeling, College of Arts and Sciences



Re: Certificate Program in Applied Geospatial Technologies

Date: 29 April 2018

I write in support of the Applied Geospatial Technologies Certificate Program proposed by the Department of Geography and Geosciences. This program would address a growing demand for geospatial technology training in a wide variety of fields (including my own).

This program will be taught entirely online by faculty and staff of the department and will require the undergraduate to complete 15 hours of course work. Careers in geospatial technology have been on the rise ever since the introduction of geographic information systems (GIS) in the 1980's. According to the US Department of Labor high growth industry profile in February 25, 2016:

“Because the uses for geospatial technology are so widespread and diverse, the market is growing at an annual rate of almost 35 percent, with the commercial subsection of the market expanding at the rate of 100 percent each year.”

(https://www.doleta.gov/brg/indprof/geospatial_profile.cfm)

The certificate program offers benefit to both the university and student. Examples would include:

- Offers added incentive to attend the University of Louisville
- Provides the student with an additional layer of credentials in this competitive field
- Puts the University of Louisville in the Geospatial Technologies spotlight by offering a completely online certificate experience.

The department is or has been involved with the Louisville and Jefferson County Information Consortium (LOJIC), Spatial Data Integrations (a local company owned by Audwin and Rae Helton), U.S. Geologic Survey, Papa John's International and the Fund for the Arts.

This proposed program will also:

- Create a skilled workforce in response to community needs
- Strengthen students' abilities in the STEM disciplines
- Apply new technologies to solve real-world problems
- Promote critical thinking and problem solving in direct application to metropolitan problems in the Louisville community

I hope you will join me in supporting this unique program.

**Undergraduate Certificate in
Applied Geospatial Technologies**_____
Title of Certificate_____
College of Arts & Sciences_____
Unit Submitting Proposal

Geography & Geosciences

Applied Geospatial Technologies

Department_____
Academic Major

Fall 2018

David A. Howarth

Proposed Starting Date_____
Certificate Program Coordinator

Approved:

Letter of Intent:

Date: January 9, 2017 _____

Faculty Senate

Date: _____

Board of Trustees

Date: _____

Council on Postsecondary Education (CPE)

Date: _____

Other (if applicable)

Date: _____

**NOTE: COUNCIL ON POSTSECONDARY EDUCATION (CPE) APPROVAL IS
REQUIRED:**

- **IF THE CERTIFICATE PROPOSAL IS 18 OR MORE GRADUATE CREDIT HOURS**
- **IF THE CERTIFICATE PROPOSAL IS 24 OR MORE UNDERGRADUATE CREDIT HOURS**

FOR MORE INFORMATION: <http://louisville.edu/oapa/academic-program-approval-process-new-proposals>

Institution: University of Louisville	
Program Name	
Undergraduate Certificate in Applied Geospatial Technologies (AGT)	
Degree Level <i>(Select)</i>	
<i>Undergraduate:</i> <input checked="" type="checkbox"/> Pre-Baccalaureate	<i>Graduate</i> <i>(select one of the following):</i> <input type="checkbox"/> Post-Baccalaureate <input type="checkbox"/> Post-Master's <input type="checkbox"/> Post-Professional
Classification of Instructional Program (CIP) Code <i>(Provost Office Use Only)</i>	
45.0702	
(CIP) Area of Study <i>(Provost Office Use Only)</i>	
Proposed Implementation Date: <i>(Semester and Year)</i>	
Fall 2018	
Institutional Contact Information	
Name: David Howarth <i>(First and Last Name)</i>	
Title: Chair	
Email: dahowa01@louisville.edu	Work Phone: 5028522693
2a. Provide a Brief Description of the Program.	
<p>This certificate program offers an additional layer of certification to undergraduate students seeking gainful employment in the growing field of geospatial technologies. The certificate requires the completion of 15 credit hours; of which 6 are required and 9 are elective hours. The program will be offered by the faculty of the Department of Geography & Geosciences in the College of Arts and Sciences.</p>	
2b. What are the objectives of the proposed program?	
<ol style="list-style-type: none"> 1. Offer a creative and marketable education in geospatial technologies 2. Increase student job market credentials 3. Attract more students (increase enrollment). 4. Increase the public's awareness of UofL as a leader in geospatial technology education 	
2c. Explain how the objectives support the institutional mission and strategic priorities, the statewide postsecondary education strategic agenda, and the statewide strategic implementation plan.	

The certificate in AGT supports the institutional and statewide higher education missions by helping to:

- Create a skilled workforce in response to community needs
- Enhance opportunities to bring new technologies into the classroom
- Strengthen students' abilities in the STEM disciplines
- Apply new technologies to solve real-world problems
- Provide on-line opportunities for students to further their skills
- Promote critical thinking and problem solving in direct application to metropolitan problems in the Louisville community

2d. Is there an approval letter from Education Professional Standards Board (EPSB) ? (Education Proposals Only)

Yes No *If yes, please attach to the proposal.*

3. Clearly state the admission, retention, and completion standards designed to encourage high quality. List Admission requirements and also provide projected enrollment and graduates for a five-year period.

Admission requires a current GPA of 3.0 or above in a given major. Students must complete required courses with a GPA of 2.75 or above. Non-UofL students must meet the same requirements at an accredited institution.

Five Year Enrollment Projections

	Year 1	Year 2	Year 3	Year 4	Year 5
Full-Time	3	5	5	8	10
Part-Time	5	7	8	10	14
Projected graduates	2	5	9	12	15

A. Indicate the expected Faculty to Student Ratio: 1:5

B. Projected Enrollment and Graduation Numbers for the First Five Years

Academic Year	Degrees Conferred	Headcount Enrollment (Fall term)
2017-18	2	8
2018-19	5	12
2019-20	9	14
2020-21	12	18
2021-22	15	24

C. Complete the Faculty Roster and attach to the Certificate proposal. The roster form is located at : <http://louisville.edu/oapa/academic-program-approval-process-new-proposals>

4. Provide the program curriculum and any options; indicate total number of credit hours required for degree completion. Complete curriculum table.

Curriculum Table

Prefix & Number	Course Title	Course Description	Credits	New	Current	Revised
Geog350 Required	Introduction to mapping and geospatial technologies	Introduction to the concepts and methods of map construction and visualization, including scale, location, projection, design, symbolism, and compilation. Exploration of these concepts and methods through the use of geospatial technologies.	3		x	
Geog558 Required	Introduction to Geographic Information Systems	Introduction to geographic information systems using ArcGIS software, management of relational databases, and manipulation and graphical output of digital geo-spatial data. May not be taken for credit if credit has been earned in GEOG 357 or 557.	3		x	

CERTIFICATE PRE-PROPOSAL FORM

Geog583 Elective	Spatial and Non-Spatial Databases	Provides students with "hands-on" experience in development, management and integration of spatial and non-spatial databases, using GIS and database management software. Prerequisite: GEOG 357 or GEOG 558.	3		x	
Geog355 Elective	Introduction to Remote Sensing	This course provides an introduction to the theory and application of remote sensing data with weekly lab reports for hands-on-experience in the acquisition and utilization of remotely-sensed data in geographical/environmental research	3		x	
Geog356 Elective	Introduction to Spatial Statistics	Introduction to multivariate statistical analyses and spatial statistics, i.e. statistical methods that use space and spatial relationships directly in their mathematical computations. Prerequisite: GEOG 256	3		x	
Geog385 Elective	Introduction to Programming and Spatial Data Analysis	There are two primary goals for this course. First, students will learn introductory computer programming concepts and features. Students will deconstruct examples from a variety of programming and scripting languages (primarily Python, R, VBA, and IDL), learning how to identify common logic, flow control and syntactic features. Students will learn the purpose of these structures and how to start using the programming and scripting environments of common statistics, geographic information systems (GIS) and remote sensing (RS) platforms.	3		x	

CERTIFICATE PRE-PROPOSAL FORM

Geog522 Elective	GIS and Public Health	Application of tools and methods of analysis in geographic information systems (GIS) to public health. Use of ArcGIS software to manage and analyze health, census and spatial data.	3		x	
Geog531 Elective	GIS and Urban Demographic Analysis	Demographic analysis through the use of GIS technology. Emphasis placed on metropolitan area characteristics including population change, segregation, ethnic settlement, social and economic stratification and commuting.	3		x	
Geog5XX Elective	Web GIS (In development)		3	x		
Geos571 Elective	GIS and Water Resources	A study of the application of Geographic Information Science techniques in water resources research and management including: digital mapping of water resources, watershed delineation and modeling atmospheric, surface and groundwater processes.	3		x	

Total Number of Credit Hours 15

5. Describe the library resources available to support this program. Provide a letter from the appropriate University Library verifying available resources.

There are no necessary resources from the University Library. Everything is via distance education. The Libraries could be used as the location from which students could complete assignments, etc.

6a. What are the intended learning outcomes of the proposed program?

Upon completion of the program the student will be fully versed in the following key areas:

- Use and application of geographic information systems programs to solve complex geospatial problems
- Use, application, and interpretation of remotely sensed data and imagery
- Use of computer programming and scripting to create custom geospatial applications
- Database storage, retrieval, and statistical analysis
- Custom Digital map presentation (paper, electronic, web) |

6b. Identify both the direct and indirect methods by which the intended student learning outcomes will be assessed.

Direct methods: Lab assignments, quizzes, research assignments, projects & exams
Indirect methods: Individual observation of students' ability to work on their own and with other students; assessment of internship projects as reported by employers.

7a. Will this be a 100% distance learning program? (Select One)

Yes

7b. Will this program utilize alternative learning formats (e.g. distance learning, technology-enhanced instruction, evening/weekend classes, accelerated courses) (Please select all that apply)

- Distance learning
- Courses that combine various modes of interaction, such as face-to-face, videoconferencing, audio-conferencing, mail, telephone, fax, email, interactive television or World Wide Web.
- Technology-enhanced instruction
- Evening/weekend/early morning classes
- Accelerated Courses
- Instruction at nontraditional locations, such as employer worksite
- Courses with multiple entry, exit, and reentry points
- Courses with "rolling" entrance and completion times, based on self-pacing
- Modularized courses

8a. Provide justification and evidence to support the need and demand for this proposed program. Include any data or student demand; career opportunities at the regional, state, and national levels; and any changes or trends in the discipline(s) that necessitate a new program.

The department has received numerous inquiries about the possibility of establishing such a program. The U.S. Department of Labor (February 2016) states that:

“Because the uses for geospatial technology are so widespread and diverse, the market is growing at an annual rate of almost 35 percent, with the commercial subsection of the market expanding at the rate of 100 percent each year.” (https://www.doleta.gov/brg/indprof/geospatial_profile.cfm)

The department is also working with local agencies and businesses to help provide employment opportunities for students and to help solve problems associated with the respective businesses/agencies. Examples include the U.S. Geologic Survey, Louisville and Jefferson County Information Consortium, Spatial Data Integrations and Papa John’s International and the Fund for the Arts. |

8b. Specify any distinctive qualities of the proposed program.

1. This would be the only “Geospatial Technologies” certificate program in the region that is awarded entirely online.
2. Program has a large demographic to draw from.
3. A recent release by Worldwidelern.com states that Geography and Cartography are now ranked as the 2th best STEM major. See: <http://www.worldwidelern.com/education-rankings/25-best-stem-majors-for-2017.html>
4. It is available to current undergraduate students at UofL and other institutions. |

8c. Does the proposed program serve a different student population (e.g. students in a different geographic area, non-traditional students, etc.) from existing programs? (Select One)

Yes

If yes, please explain:

| Supplemental certificate for Urban Studies, Justice Admin, Biology, Engineering, and Public Health students

|

9a. How will the program support or be supported by other programs within the institution?

Yes No

If yes, please explain:

| We expect a significant number of students from other disciplines to enter and complete the program.

|

9b. Will this program replace or enhance any existing program(s) or track(s), concentration(s), or specialization(s) within an existing program?

Yes

If yes, please explain:

| This certification would be a significant complement to majors in Criminal Justice, Engineering, Biology, Public Health and other majors.

|

10. Relationship with programs at other institutions (if applicable)

| None

|

11. Faculty Resources: If additional faculty (including graduate assistants) will be required within the next five years, indicate the number and role of each new faculty member.

| No new faculty will be required that we foresee at this time. |

12. Preliminary resource estimates - The resource requirements and planned sources of funding of the proposed program must be detailed in order to insure the adequacy of the resources to support a quality program.**12a. Will this program require additional resources?**

Yes No

If yes, provide a brief summary of additional resources that will be needed to implement this program over the next five years.

| Distance education revenue will support the program and possibly pay for additional graduate student support. This 'support' is for students who will help with assessment, maintaining software and equipment and development of exercises under the supervision of faculty members. It is not financial assistance for students in the program.

\$5,000 in years 2 and 4 for undergraduate student employees

\$10,000 in years 3 and 5 for graduate student stipends

\$6,000 in year 3 for new server

\$2,500 in years 1 and 4 for marketing and advertising

\$2,000 in year 2 and \$3,000 in year 5 for software upgrades |

12b. Will this program impact existing programs and/or organizational units?

Yes No

If yes, please describe the impact on existing programs, will resources be allocated (i.e. reassign faculty or staff, change course offerings, reduction in students served?)

| Because all but one of the courses is already offered, there will be little impact on current course offerings. As older faculty retire, they will be replaced by new faculty with enhanced skills in geospatial technologies, thus enabling a wider range of relevant courses. We expect an increase in students served. |

12c. Complete program proposal budget form located at: <http://louisville.edu/oapa/academic-program-approval-process-new-proposals>

Note: Financial Aid for Certificate Programs

Students enrolled in stand-alone certificate programs are not eligible for federal financial aid. The university elected on 6.30.2012 to opt out of participation with the Department of Education (DOE). To qualify for federal aid, the law requires that most for-profit programs and certificate programs at nonprofit and public institutions prepare students for gainful employment in a recognized occupation. UofL students must be enrolled in a degree granting program in conjunction with the certificate program to receive federal aid.