FREE AND OPEN SOURCE SOFTWARE FOR GEOSPATIAL APPLICATIONS UNDERGRADUATE CERTIFICATE

Introduction

Please click here (http://catalog.ucdenver.edu/cu-denver/graduate/schools-colleges-departments/college-liberal-arts-sciences/geography-environmental-sciences/) to see Geography and Environmental Sciences department information.

Certificate Advisor: Rafael Moreno
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Students receiving the certificate will be able to design and develop FOSS4G exclusive or hybrid (using FOSS4G and proprietary software) geospatial information infrastructures and applications capable of better addressing specific socioeconomic, technological, institutional, and financial contexts where GISc&T is used to support planning and decision making.

Certificate Objectives

1. Provide students and working geospatial professionals with the knowledge and skills for the effective use and development of FOSS4G solutions in diverse application contexts. This complements and enhances the knowledge and skills they have in the use of geospatial proprietary software solutions.
2. Students will be exposed to several FOSS4G alternatives to address the needs of a geospatial information infrastructure from desktop, database management systems, systems automation/customization, all the way to Web/Cloud-based applications and enterprise level solutions.
3. Students will acquire the necessary knowledge and skills to effectively use the most advanced FOSS4G alternatives to develop solutions for each of levels of a geospatial information infrastructure previously mentioned.
4. Students will have the knowledge and hands-on skills that will enable them to design and develop hybrid geospatial information infrastructures that make use of proprietary software and FOSS4G incorporating each them in a combination that maximizes efficiency of the end infrastructure.

Program Delivery

- This is an on-campus program.

Declaring This Certificate

Students interested in completing this certificate should complete the CLAS Undergraduate Certificate Intent to Declare Form (https://ucdenver.co1.qualtrics.com/jfe/form/SV_2hNYIHqVx0Ta0Dk/), which requests that the certificate be added to your student record. Once added, you will be able to run a certificate degree audit. The certificate degree audit should be used in collaboration with the Certificate Advisor to ensure successful completion of the requirements.

Students should then work with Rafael Moreno (rafael.moreno@ucdenver.edu) – the certificate advisor, to ensure completion of all certificate requirements.

Completing This Certificate

Students must also complete the CLAS Undergraduate Certificate Completion Verification Form, (https://ucdenver.co1.qualtrics.com/jfe/form/SV_eyPLZI6vVh0wG8K/) before graduation, in order to confirm completion of their certificate. The certificate advisor will confirm that your certificate has been successfully completed, and will work with campus partners to apply the certificate to your transcript.

Students must fill out the Certificate Completion Form before the deadlines below, to ensure the certificate is applied to your transcript correctly. If you are a non-degree seeking student, please fill out this form in the term in which you intend to complete your certificate.

Spring semester – **April 1**
Summer semester – **July 1**
Fall semester – **November 1**

These program requirements are subject to periodic revision by the academic department, and the College of Liberal Arts and Sciences reserves the right to make exceptions and substitutions as judged necessary in individual cases. Therefore, the College strongly urges students to consult regularly with their Free and Open Source Software for Geospatial Application advisor to confirm the best plans of study before finalizing them.

General Requirements

- Click here (http://catalog.ucdenver.edu/cu-denver/undergraduate/academic-policies-procedures/) for information about Academic Policies.

Certificate Requirements

1. Students must complete a minimum of 12 credit hours.
2. Students must complete a minimum of 12 upper division (3000 or above) credit hours.
3. Students must earn a minimum grade of B (3.0) in all courses that apply to the certificate and must achieve a minimum cumulative certificate GPA of 3.0. Courses taken using P+/P/F or S/U grading cannot apply to certificate requirements.
4. Students must complete all coursework with CU Denver faculty.

Certificate Restrictions, Allowances and Recommendations

1. The students will have the option to take other courses above and beyond the core requirements for the certificate.

Code	Title	Hours
Complete the following courses:		**12**
CVEN 5385	GIS Relational Database Systems	
Students learn the principles and techniques to design a spatial database and perform multiple analyses and functions in a FOSS4G spatial database management system.		
GEOG 4086	FOSS4G Systems Integration	

	This course functions as the capstone for the certificate. It concentrates on applying all the knowledge and skills previously obtained and adding more in the area of integration of geospatial information infrastructures based on FOSS4G. Students work on integrating systems from desktop to Web/Cloud-based applications.	
GEOG 4091	Open Source Software for Geospatial Applications	
	This course exposes students to the diversity of FOSS4G solutions that exist for each of the elements of geospatial information infrastructure. They acquire the necessary hands-on skills to effectively use one FOSS4G to address the needs of each of the levels of a geospatial information infrastructure.	
GEOG 4092	GIS Programming and Automation	
	Students learn programming principles and techniques to automate processes and customize a geographic information system (GIS), and to integrate and coordinate the functions of diverse geospatial software (e.g. a database management system with a GIS).	
Total Hours		**12**

Optional Courses

Students can choose to complete the following course that can complement their formation in specific topics. However, this course is not required as part of the certificate program.

Code	Title	Hours
BIOL 3763	Course BIOL 3763 Not Found	
This course uses the open source software R for environmental data analysis including spatial statistics and geostatistics.		
GEOG 5050	Applied Spatial Statistics	
This course is offered annually as part of the GES offerings. It also uses R for data analysis including spatial statistics and geostatistics.		
GEOG 4095	Deploying GIS Functionality on the Web	
This course uses FOSS4G for database analysis and creation of Web-based GIS systems.		

To learn more about the Student Learning Outcomes for this program, please visit our website (https://clas.ucdenver.edu/ges/programs/certificates/sustainable-urban-agriculture-certificate/).