Spatial Data Science and Technology (BA/BS)

Spatial data is integrated in our everyday lives. From geotagging to geocaching to finding a place to enjoy some coffee, we are all integrated in a complex web of movement, place, and discovery. Spatial data science and technology is not a program about making maps—it's about asking relevant questions, harnessing data, and understanding the appropriate way to use it. It's not just about learning how to use software programs, but about how you can contribute to a new generation of digital technologies that represent a high-growth industry—one that is revolutionizing business, nonprofit, and government worlds alike. At the UO, faculty members use spatial technologies to focus on remote sensing of river systems, climate change analysis, web-mapping, cartography, spatial cognition, spatial decision-making, and social equity.

This major is very flexible with four required courses in geography and computer science, and then eight electives that students can focus in their areas of interest. Our courses focus on geographic information systems science, cartography, remote sensing, spatial analysis, and spatial modeling.

Program Learning Outcomes

Upon successful completion of this program, students will be able to:

- Exhibit an understanding of the spatial and mathematical foundations of spatial data
- Be able to develop and utilize technology infrastructure and interface design in order to contribute to the development of geospatial technologies and analysis.
- Recognize the ethical implications of geospatial data and technologies, including individual-level location information sharing, inequalities that some geospatial technologies produce, and the role of geospatial technologies in humanitarian crises
- Apply geospatial data and technologies to collect and analyze information from real-world situations
- Develop the skills to interpret and effectively communicate findings of geospatial data analysis to a wide range of audiences

The spatial data science and technology major requires a minimum of 48 credits, drawing on courses in geography and computer information science. The major requires four compulsory courses (16 credits) that provide foundational skills, concepts, and critical thinking abilities. An additional eight elective courses (32 credits) are required. Upon declaring the major, students meet with the geography undergraduate advisor to tailor a series of elective courses best suited to individual student needs and employment aspirations. At least nine courses used for the major must be taken for a letter grade. A grade of C– or better and a GPA of 2.25 or better is required in courses applied to the major.

For more information, contact the Tykeson hall advising center at tykesonadvising@uoregon.edu, or email the Director of Undergraduate Studies, Leslie McLees here (geogadvr@uoregon.edu), or schedule an advising appointment at https://cas.uoregon.edu/advising/access-advising (https://cas.uoregon.edu/advising/access-advising/)

Spatial Data Science and Technology Major Requirements

Core courses provide foundational skills, concepts, and critical thinking abilities. Some of the introductory courses, such as GIScience I (GEOG 481), are prerequisites for more advanced courses. Students are not required to complete these before moving to elective courses (except where prerequisites are required).

Electives. Rather than adopting a series of specializations, the electives component will remain flexible. Upon declaring the major, students should meet with the undergraduate advisor to work out a series of courses that best fit student needs and employment aspirations. A full list of elective courses can be found on the major page (https://geography.uoregon.edu/sdst/) on the department website.

Code	Title	Credits
Core Courses		
GEOG 181	Our Digital Earth	4
DSCI 101	Foundations of Data Science I	4
or MATH 343	Statistical Models and Methods	
or MATH 425	Statistical Methods I	
or STAT 243Z	Elementary Statistics I	
GEOG 481	GIScience I	4
CS 122	Introduction to Programming and Problem Solving	4
Elective Courses		
Choose courses totaling 32 credits from the following:		32
GEOG 393	Data Driven Cartography	
GEOG 403	Thesis	
GEOG 482	GIScience II	
GEOG 485	Remote Sensing I	
GEOG 486	Remote Sensing II	
GEOG 489	Mapping with Drones	
GEOG 490	GIScience: [Topic] [1]	
GEOG 491	Advanced Geographic Information Systems	
GEOG 492	Web Mapping	
GEOG 493	Advanced Cartography and Geo-Visualization	
GEOG 494	Spatial Analysis	
GEOG 495	Geographic Data Analysis	
GEOG 498		
CS 210	Computer Science I	
CS 211	Computer Science II	
Total Credits		**48**

[1] Special topics include courses that are offered less frequently, but also qualify for credit when offered under the course number GIScience: [Topic] (GEOG 490). Topics include Web Mapping, Server GIS, Qualitative Spatial Reasoning, and Spatial Simulation.

Honors Programs

The Department of Geography offers an honors option for its majors. More information is available on the department website (https://socialsciences.uoregon.edu/geography/undergraduate-programs/honors-requirements/), contact the undergraduate support

at undergradasu7@uoregon.edu, or email the Director of Undergraduate Studies, Leslie McLees here (geogadvr@uoregon.edu).

Four-Year Degree Plan

The degree plan shown is only a sample of how students may complete their degrees in four years. There are alternative ways. Students should consult their advisor to determine the best path for them.

Bachelor of Arts in Spatial Data Science and Technology

Course	Title	Credits	Milestones
First Year			
Fall			
GEOG 181	Our Digital Earth	4	
WR 121Z	Composition I	4	
Core-education course in arts and letters that also satisfies cultural literacy requirement		4	
First term of 1st-year second-language sequence		5	
	Credits	**17**	
Winter			
WR 122Z	Composition II	4	
DSCI 101	Foundations of Data Science I	4	
Core-education course in social science		4	
Second term of 1st-year second-language sequence		5	
	Credits	**17**	
Spring			
CS 122	Introduction to Programming and Problem Solving	4	
Core-education course in arts and letters		4	
Core-education course in social science that also satisfies cultural literacy requirement		4	
Third term of 1st-year second-language sequence		5	
	Credits	**17**	
Second Year			
Fall			
GEOG 481	GIScience I	4	
Core-education course in arts and letters		4	
Core-education course in science		4	
First term of 2nd-year second-language sequence		5	
	Credits	**17**	
Winter			
Core-education course in arts and letters		4	
Elective courses in spatial data science and technology		8	
Second term of 2nd-year second-language sequence		5	
Consider studying abroad			
	Credits	**17**	
Spring			
Elective course in spatial data science and technology		4	
Elective courses		8	
Third term of 2nd-year second-language sequence		5	
	Credits	**17**	
Third Year			
Fall			
Elective course in spatial data science and technology		4	
Core-education course in science		4	
Upper-division elective courses		8	
	Credits	**16**	
Winter			
Elective course in spatial data science and technology		4	
Core-education course in social science		4	
Core-education course in science	Investigate summer internships	4	
Upper-division elective course		4	
	Credits	**16**	
Spring			
Elective course in spatial data science and technology		4	
Upper-division elective course		4	
Cultural literacy course		4	
Elective course		4	
	Credits	**16**	
Fourth Year			
Fall			
Elective course in spatial data science and technology		4	
Upper-divisin elective courses		8	
Cultural literacy course		4	
	Credits	**16**	
Winter			
Elective course in spatial data science and technology		4	
Upper-division elective course	Apply for graduation on DuckWeb	4	
Elective course		4	
Start a job search with geography academic career advisor			
	Credits	**12**	
Spring			
Upper-division elective course		4	
Elective courses		8	
	Credits	**12**	
	Total Credits	**190**	

Bachelor of Science in Spatial Data Science and Technology

Course	Title	Credits	Milestones
First Year			
Fall			
GEOG 181	Our Digital Earth	4	
WR 121Z	Composition I	4	
Core-education course in arts and letters that also satisfies cultural literacy requirement		4	
Mathematics course		4	
	Credits	**16**	

Winter

DSCI 101	Foundations of Data Science I		4
WR 122Z	Composition II		4
Core-education course in social science			4
Mathematics course			4
	Credits		**16**

Spring

CS 122	Introduction to Programming and Problem Solving		4
Core-education course in arts and letters			4
Core-education course in social science that also satisfies cultural literacy requirement			4
Mathematics course			4
	Credits		**16**

Second Year

Fall

GEOG 481	GIScience I		4
Core-education course in arts and letters			4
Core-education course in social science			4
Core-education course in science			4
	Credits		**16**

Winter

Elective courses in spatial data science and technology			8
Core-education course in arts and letters			4
Core-education course in social science			4
	Credits		**16**

Spring

Elective course in spatial data science and technology			4
Core-education course in social science			4
Core-education course in science			4
Elective course			4
	Credits		**16**

Third Year

Fall

Elective course in spatial data science and technology			4
Core-education course in science			4
Upper-division elective courses			8
	Credits		**16**

Winter

Elective course in spatial data science and technology			4
Core-education course in social science			4
Core-education course in science		Investigate summer internships	4
Upper-division elective course			4
	Credits		**16**

Spring

Elective course in spatial data science and technology			4
Upper-division elective course			4
Cultural literacy course			4
Elective course			4
	Credits		**16**

Fourth Year

Fall

Elective course in spatial data science and technology			4
Upper-division elective courses			8
Cultural literacy course			4
	Credits		**16**

Winter

Elective course in spatial data science and technology			4
Upper-division elective course		Apply for graduation on DuckWeb	4
Elective course			4
Start a job search with geography academic career advisor			
	Credits		**12**

Spring

Upper-division elective course			4
Elective courses			8
	Credits		**12**
	Total Credits		**184**