

BIO 376: Biological Applications of Geographic Information Systems

(Fri 1:00 – 3:50 CKB 316)

Instructor

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Course Description

This course offers an introduction to concepts underlying geographic information systems (GIS) and methods of managing and processing geographic information. The course is designed for students who have little background but want to learn the fundamentals and applications of GIS. The nature of geographic information, data models and structures for geographic information, geographic data input, data manipulation and data storage, spatial analytic and modeling techniques will be discussed. Students will be exposed to both theoretical knowledge and technical skills in this course. Lab assignments and a course project will promote students' application of concepts and skills in solving real-world problems.

Learning Objectives

Students will recognize the fundamentals of geographic information systems.
Students will demonstrate the concepts and applications of geospatial technologies.
Students will apply basic skills of geospatial data processing using GIS software.
Students will analyze and interpret geospatial data using maps for visualization and presentation.

Students will design project using GIS concepts and techniques based on real-world problems.

Prerequisites

There are no prerequisites for this course.

Suggested Textbook & Reading:

Bolstad, Paul. GIS Fundamentals: A First Text on Geographic Information Systems, 6th Edition.

<https://courses.spatialthoughts.com/introduction-to-qgis.html#data-credits>Links to an external site.

<https://www.observingeearthfromabove.com/tutorials.html>Links to an external site.

Course Structure: The course content will be lecture and lab based. Additionally required readings may be posted online. Slides from the lectures and lab instructions will be made available on Canvas.

Grading:

Grades will be a combination of exams, labs, projects, quizzes and attendance. Grading will be on a 100 point scale.

90 – 100: A | 80 – 90: B | 70 – 80: C | 65 – 70: D | Sub-65: F

The top and bottom 3 points in any letter grade will be + or -. E.g. 80, 81, 82 are a B -; 83, 84, 85, 86 are a B; 87, 88, 89 are a B+.

	<u>Weight</u>
Exams	30%
Labs	30%
Participation	10%
Projects	30%

Tentative Schedule:

The following is a tentative schedule. Dates and materials are subject to change.

	Lecture	Lab
9/5/25	Course logistics & Introduction	Installing QGIS + Making maps

9/12/25	Data Models and Structures	Accessing Raster data
9/19/25	GIS data sources I (GPS & RS & online)	Mapping raster data
9/26/25	GIS data sources II (GPS & RS & online)	vector mapping
10/3/25	Datums, Map Projections, Cartography	create your own map
10/10/25	Exam I	
10/17/25	Midterm review & Databases	project I
10/24/25	Spatial analysis I	project I
10/31/25	project I presentation	project I
11/7/25	Spatial analysis II	project II
11/14/25	Paper discussion	project II
11/21/25	Exam II	project II
11/26/25	Guest lecture	project II
12/5/25	Project presentation	