

# **BIO 376: Biological Applications of Geographic Information Systems**

## **(Fri 1:00 – 3:50 CKB 316)**

### **Instructor**

Dr. Xiaonan Tai

Office: CKB 428D

Office Hours: Fridays noon - 1 pm by appointment

Email: [xiaonan.tai@njit.edu](mailto:xiaonan.tai@njit.edu)

### **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.

### **Required Textbook:**

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

### **Suggested reading:**

Michael Law and Amy Collins. Getting to know ArcGIS desktop

**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+.

	<b><u>Undergrad</u></b>
<b>Exams</b>	30%
<b>Labs</b>	30%
<b>Participation</b>	25%
<b>Project</b>	15%

### **COVID-19 Safety Requirements:**

All persons physically present in any department facility or classroom shall comply fully with the NJIT COVID-19 safety policy at all times. Masks must be worn before entry to all department facilities and classrooms, and social distancing guidelines must be followed. Individuals who are unable to wear a face mask due to medical reasons should contact the Office of Disability Services or Human Resources. Students who enter a classroom without wearing a mask properly, or remove their mask, will be cautioned by the instructor. The same is true for students who disregard the seating order or guidelines for social distancing. Students with obvious symptoms of respiratory illness should not come to campus and will be asked to leave. Students who do not comply with a request by a department instructor to adjust their behavior, in accordance with the University Policy, will be subject to disciplinary actions. Instructors have the right to expel the student or terminate the class session at which any student fails to comply with the University Policy.

### **Academic Dishonesty:**

Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at: <http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf>. Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university. If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at [dos@njit.edu](mailto:dos@njit.edu).

### **Tentative Schedule:**

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

	Lecture	Lab
9/8/2023	Introduction to GIS	
9/15/2023	Data Models and Structures	Interacting with maps
9/22/2023	Datums, Map Projections	interacting with data
9/29/2023	Cartography	Working with coordinate systems and projections
10/6/2023	GPS	symbolology and classifying features
10/13/2023	RS1	making maps
10/20/2023	Midterm exam	project brainstorm
10/27/2023	RS2 + online data + class project + midterm review	Working with online platforms
11/3/2023	tables	Feature query and selection
11/10/2023	Vector analysis	Vector analysis
11/17/2023	Raster analysis	Raster analysis
11/22/2023	Guest lecture	
12/1/2023	Final exam	
12/8/2023	Project presentation	