

# **Introduction to Geospatial Technologies**

IGME 382

Spring 2023

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**Instructor:** Josh Sisskind

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**Phone:**

**Office Hours:** By Appointment via Zoom; Best times are Tuesday 4-5pm and Friday 12-1pm

**Class Meeting Time:** Class materials will be posted no later than 10:00 am each Tuesday

## **1. General Course Information**

### **1.1. Course Description**

This course provides a survey of technologies used to represent the earth, collectively referred to as Geospatial Technologies (GTs). Students will gain hands-on experience with GTs, including Global Positioning Systems (GPS), Geographic Information Systems (GIS), Virtual Globes (Google Earth), Remote Sensing, and Web GIS. Students will be taught how geospatial technology is used in business, industry, and government. Students should be comfortable working in PC-based computing environments.

### **1.2. Course Objective**

Broader developments with information technology have increased the use and application of GTs. For example, GTs have become common place in numerous industries such as telecommunications, civil engineering, and crisis management. Furthermore, 80% of all data contains a spatial component, thus making GTs relevant and applicable to very wide range of information management tasks. The objective of this course is to expose students to foundational concepts and technologies of GTs. Students taking the course will be able to continue with additional GT courses on remote sensing. Geographic Information Systems (GISs), spatial databases, mobile GIS, spatial analysis, geographic visualization, and applications of GTs to environmental, societal, and other problem domains.

### **1.3. Course Assumptions**

This is an online course, but students should expect to spend as much time and effort in this course as they would in a face-to-face offering. Throughout the semester, you will be required to complete several lab assignments and readings. Students should expect to spend 3-6 hours outside of class time in order to complete readings and assignments. Students are encouraged to talk to me about their own interests in geospatial technologies.

## **2. Course Materials**

## **2.1. Textbooks and Readings**

Readings will be assigned by Instructor as needed and made available through myCourses.

## **2.2. Software and Accounts**

### **2.2.1. ArcGIS Pro and ArcGIS Online**

This course will use ArcGIS Pro and ArcGIS Online. Each student will be provided the required software installer and license during the course. ArcGIS Pro will only work on Windows computers (<https://pro.arcgis.com/en/pro-app/get-started/arcgis-pro-system-requirements.htm>). The RIT Lab will have access to the software as well and arrangements can be made to access the facility. A third option for the software is a Virtual Machine with ArcGIS Pro installed, although using the software locally is highly recommended. ArcGIS Online should be compatible with any operating system assuming you have access to a modern web browser (e.g., Chrome, Firefox, Edge).

### **2.2.2. OpenStreetMap**

This course will also use OpenStreetMap as an example of using web-based mapping applications. I will provide instructions once the course begins as to how to create an account. If you already have an account to OSM, you may choose to use that or create a new one specific for this course.

## **2.3. myCourses**

The myCourses systems will be used for facilitation of the course. Students are expected to know how to use the myCourses system and their RIT email accounts.

## **2.4. Other Materials**

You are required to maintain your own datasets so a large capacity USB drive is recommended (at least 16 GB). You will also be required to use a mobile application that will be compatible for iOS or Android. Accommodations can be made if you do not have access to a smart phone or are unable to download applications.

## **3. Administrative Information**

### **3.1. Grades**

Grades will be assigned according to points earned throughout the semester. These points are based on the following categories:

Item	% of Grade
Assignments	50
Class Participation / Quizzes	10
Mid-term Exam	15
Final Project	25

Total	100%
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There will not be a curve applied nor will an incomplete be given.

#### 4. Course Organization

This course will only be offered online with no in person instruction scheduled. It is possible that a TA will be available on campus to assist with lab access with updates to come throughout the semester.

All lectures (including slides and recordings), quizzes and discussion points, and assignments will be posted no later than 10:00 AM on Tuesday morning. It is your responsibility to work on them on your own. If you run into trouble – reach out! I am happy to help during office hours or at a time that is convenient for us both.

I will not be on campus at any point during the semester but will be available during office hours and by appointment using a signup approach.

Please note that this schedule is tentative and may change during the semester.

Course Outline	
Week	Topics
1	Course Introduction and Overview of Geospatial Technology
2	Fundamentals of Mapping
3	Understanding Geospatial Data and Geospatial Data Sources
4	Introduction to Geographic Information Systems (GIS)
5	Geospatial Data Creation and Management
6	Global Navigation Satellite Systems (GNSS), GPS, and Geocoding
7	Introduction to Remote Sensing
8	Midterm Exam and Introduction to Story Maps
9	No Class – Spring Break
10	Geoprocessing and Python
11	Web GIS: Maps and APIs
12	OpenStreetMap and Open Source Geospatial
13	Geospatial Technology in Industry, Government, and the World; Final Project Intro
14	Final Project Working Time

Course Outline	
15	Final Project Working Time
16	No Class – Final Project Due

#### **4.1. Online Quizzes or Discussions**

There will be a short quiz and/or discussion each week that pertains to that topic. All quizzes and graded discussions will be posted no later than 10:00 AM on Tuesday and will be due no later than 5:00 PM Friday.

#### **4.2. Assignments**

Assignments will be a combination of readings and hands-on labs that will explore that week's topic. All reading assignments will be provided and will not need to be purchased. Labs will require software to be downloaded or accessed through web portals.

Assignments will be posted no later than 10:00 AM on Tuesday. Reading assignments may be required for the quiz or discussion that week (see above). Lab assignments will typically be due no later than 5:00 PM Friday unless otherwise noted.

Assignments turned in late will result in an automatic loss of one letter grade for each day late. After five days late, the assignment will result in a grade of 0 for that assignment. With prior notice (at least 3 days) before a due date, an assignment may be handed in late. Also, extenuating circumstances occur – it is better to reach out if a situation arises as opposed to not handing in an assignment.

#### **4.3. Mid-Term Exam**

There will be a mid-term the week before Spring Break. This will look to assess your understanding of the material up to this point in the class. The mid-term exam will consist of a combination of true/false, multiple-choice, and short answer questions based on the content provided up to that point.

#### **4.4. Final Project**

The final project will demonstrate what you have learned in the course and provide an outlet for your own interests in geospatial technologies. Students will develop their own project ideas utilizing GIS and Geospatial Technology to look at a world problem (big or small!). You will be required to find your own data, conduct some analysis, and create a final deliverable. It is likely that we will use a Story Map via ArcGIS Online and will cover how to create them in class. Other options may be available and will be discussed as we get closer.

### **5. RIT Course Information**

#### **5.1. Academic Dishonesty**

Students are expected to be familiar with and abide by the Academic Honesty Policy as stated in the RIT Student Rights and Responsibilities.

You may review the posted policy on the RIT Student Rights and Responsibilities web site ([http://www.rit.edu/studentaffairs/studentconduct/rr\\_academicdishonesty.php](http://www.rit.edu/studentaffairs/studentconduct/rr_academicdishonesty.php)).

This policy covers all courses at RIT unless otherwise noted by the instructor, the department, or the college in which the course is offered.

Plagiarism in any format will NOT BE TOLERATED. Academic prosecution of students caught plagiarizing can and will be conducted leading to failing grades for assignments and/or expulsion and failure of the course. If you are unsure of what constitutes plagiarism and how to avoid it, err on the side of caution and consult this guide:

<https://library.rit.edu/instruction/dl/stud.html> or the instructor for assistance.

## **5.2. ADA Statement**

RIT is committed to fostering an environment where students with disabilities have the same access to academic programs, support services, social events, and physical facilities as every other student.

Please review the posted policy in the Students Rights & Responsibilities ([http://www.rit.edu/studentaffairs/studentconduct/rr\\_disabilitiesservices.php](http://www.rit.edu/studentaffairs/studentconduct/rr_disabilitiesservices.php)) for further information and details on the application for accommodations.

The course will be accommodated for disabilities provided that they disclosed to the instructor the first week of classes. Do not wait until you are doing poorly in the course to request accommodation; poor grades will not be altered once earned. You must have current documentation from RIT's Office for Disability Services (ODS) that confirms your disability status and supports your request for academic adjustments, auxiliary aids, and services: <http://www.rit.edu/studentaffairs/disabilityservices/index.php>

## **5.3. Discrimination Statement**

RIT is committed to providing a safe learning environment, free of harassment and discrimination as articulated in our university policies located on our governance website. RIT's policies require faculty to share information about incidents of gender based discrimination and harassment with RIT's Title IX coordinator or deputy coordinators, regardless whether the incidents are stated to them in person or shared by students as part of their coursework.

If you have a concern related to gender-based discrimination and/or harassment and prefer to have a confidential discussion, assistance is available from one of RIT's confidential resources on campus (listed below).

1. The Center for Women & Gender: Campus Center Room 1760; 585-475-7464; CARES (available 24 hours/7 days a week) Call or text 585-295-3533.
2. RIT Student Health Center – August Health Center/1st floor; 585-475-2255.
3. RIT Counseling Center - August Health Center /2nd floor - 2100; 585-475-2261.
4. The Ombuds Office – Student Auxiliary Union/Room 1114; 585-475-7200 or 585-475-2876.
5. The Center for Religious Life – Schmitt Interfaith Center/Rm1400; 585-475-2137.
6. NTID Counseling & Academic Advising Services – 2nd Floor Lynden B. Johnson; 585-475-6468 (v), 585-286-4070 (vp).

## **5.4. Other Information**

Likewise, it is strongly recommended that the instructor be contacted when a crisis occurs during the semester that affects your academic performance so accommodations can be made before poor participation or classwork affects your grade.