

# GIS2114: The World & Big Data

## Instructor(s):

Natalia Dambe
Tuesday 13:00-14:00pm ( <i>Online office hours through <a href="#">zoom conference</a>, meeting ID: 996 1965 7442, in Canvas.</i> )
Friday 13:00-14:00

## 1 Course Overview & Objectives

### UF Online Asynchronous – No in-person meeting

**Overview:** Today's world is driven by data. Political, economic, and environmental decision-making is increasingly dependent on big data sets. Services like Google personalize what you see and advertise upon data about you and 'customers like you'; social media allow the public to directly and proactively participate in activities such as urban planning, disaster reporting, and humanitarian interventions.

“80% of data is geographic” (Morais, 2012). While this statement is arguable, real world datasets are geographically and temporally referenced when they are collected by devices with location-aware sensors such as the Global Positioning System (GPS) receivers, mobile phones, and vehicles. Technologies such as wireless local area networks (WLAN) make it feasible to collect georeferenced data within the indoor environments. The increasing volume and varying formats of these geospatial big spatial datasets have posed new challenges in data storage, management, process, analysis, visualization, and quality control. Ethical and geo-privacy issues have also emerged in recent applications of big data techniques in tracking human activities

**Objectives:** This course will introduce relevant concepts (e.g., 5 V's) and techniques (e.g., cloud computing) of big (spatial) data as well as its applications in the real world, such as building smart cities as well as disaster management. The students will also have hands-on experiences.

### Learning outcomes

After completing this course, the students are expected to:

- Understand the unique characteristics of big data
- Be familiar with the techniques used for collecting, storing, managing, processing, analyzing, and visualizing big data
- Know how big data can solve real-world problems
- Grasp basic skills to contribute, retrieve, and visualize big spatial datasets
- Be aware of issues in using big spatial data

## 2 Instructors

**Natalia Dambe** ([n.dambe@ufl.edu](mailto:n.dambe@ufl.edu))

Natalia is a graduate student in the Dept. of Geography. Her research interests include Geospatial Techniques and renewable energy. Registered as Geo-Information Sciences Practitioner with South African Geomatics Council established in terms of Act 19 of 2013. Has at least six years' experience in

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technology of collection, measuring, processing, analyzing, displaying interpreting, disseminating, utilizing, evaluating, and managing geographically related and spatially referenced information. That also includes three years of experience in renewable energy project development, years in academia and research.

### **3 Office Hours**

Office hours will be held on Tuesdays and Thursdays. Please note that the office hours will be held in the [Zoom conference](#) tool on Canvas, *meeting ID: 996 1965 7442*. If you need to meet with me outside of office hour times, please email to set up an appointment.

### **4 Emailing**

I do my best to answer e-mail questions promptly (by the next school day ~24 hours). If you do not receive a response within 36 hours, please follow up with me because I may not have received the e-mail for various reasons. Please note that any inquiries about your grade can only be done through the Canvas messaging system, as per UF's guidelines.

### **5 Texts**

Readings and other items will be posted in canvas as needed in advance of weekly activities and assignments. Readings will include peer reviewed journal articles and other documents (1-3 per week).

**Optional:** Thatcher J, Eckert J, and Shears A (Eds.). Thinking big data in geography: new regimes, new research. University of Nebraska Press, 2018.

### **6 Assessments**

**Labs (50%)** – Throughout the semester you will be completing several labs. Due dates and submission instructions can be found in Canvas.

**Final Project (15%)** – Your final project requires you to design a lab assignment of your own, using data and methods of your choice. This can be done in R or Google Earth Engine. You will then exchange your lab with a classmate and will be tasked with completing the assignment designed by your peer. For more details and due dates, please see Canvas. Please note you will be expected to schedule a meeting during week 7 to discuss your proposed project.

**Class Activities & Participation (20%)** – You will have various class activities throughout the semester that will be completed either in in groups or as individuals. This includes assignments such as: reading questions, discussion posts, and Write What You Think activities (reflections on material). You are also expected to participate by posting questions or answering questions posted by your peers in the various discussion boards in Canvas. Questions concerning specific assignments can be posted for your classmates to answer in the **Lab Questions discussion board**. There is also a discussion board titled **Miscellaneous Interests**, which can be used to post links to articles/videos that you think may be of

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interest to other students. You are expected to post at least 2 times in these additional discussion boards during the semester (e.g. in addition to the regular module discussion boards).

**Exams (15%)** – You will have a mid-term and final exam. The mid-term will cover modules 1-7, and your final will cover modules 8-12. These exams will not be proctored, so you can use your notes, but you should NOT take the exams with classmates. Additionally, your exams will be timed so you should not open the exam until you are prepared to complete it in its entirety (you will not have time to look up every question!).

### 7 Grading

A	A-	B+	B	B-	C+	C	C-	D+	D	D-	E
100-93	92-90	89-87	86-83	82-80	79-77	76-70	69-67	66-63	62-60	59-57	<57

**It is your responsibility to know how well you are doing in the class.**

There will be a Grades tab in Canvas for following your progress. Please use it to keep track of your score and contact me if there is a discrepancy. If you are not satisfied with the score you receive on an assignment or feel an error has been made, you will be permitted **two weeks** from the time the score was posted for a review of the assessment. After this time the score will be entered as a permanent grade.

Please see the UF catalog grading policies for current guidelines not discussed here:

<https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

### 8 Late Policy

Late assignments will only be accepted 48hrs after they are due (including weekends) and there will be a 10% penalty per day.

If you cannot complete an assignment or an exam because of an excused reason (illness, family emergency, etc.), please contact me as soon as possible. In order for the assignment to be excused, **official documentation** must be provided to either instructor. Instructions on how to send the documents will be handled at the time I am informed of the incident.

### 9 Academic Honesty

[Accountability to Academic Honesty](#)

You are all bound by the student academic honor code.

*We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.*

***"On my honor, I have neither given nor received unauthorized aid in doing this assignment."***

In the Assessments, Canvas will shuffle the order of the questions and the order of the possible answers, generating a nearly unique assessment per student. **Plagiarism or cheating of any variety on any assignment will not be tolerated.** If a student is suspected of cheating and there is sufficient evidence in

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support of the allegation, the student will be reported to the appropriate student body, according to the University's Student Conduct and Conflict Resolution system.

### **11 Special Accommodations**

Students requesting disability-related academic accommodations must first register with the **Disability Resource Center**. <http://www.dso.ufl.edu/drc/>

- The Disability Resource Center will provide documentation to the student—each student requesting special accommodations must provide this documentation to the Instructor. We do not automatically receive this information, so the student is responsible with providing the DSO request to the Instructor.
- We will honor all requests. Please contact an instructor by e-mail to make appointment so that we can go through these accommodations and sign the form.

### **12 Student Support Services**

If you are a student in a distance learning course or program you have access to the same student support services that on campus students have. For course content questions contact your instructor(s).

- For any technical issues you encounter with your course please contact the UF computing Help Desk at 342-392-4357. For Help Desk hours visit: <http://helpdesk.ufl.edu/>.
- For a list of additional student support services links and information please visit: <http://www.distance.ufl.edu/student-services>
- In some special circumstances (when documentation is not available, for instance), we may ask you to contact the Dean of Students Office: **The Dean of Students Office**: 202 Peabody Hall, PO Box 114075, Phone: (352) 392-1261
- The Dean of Students is a resource, available to all students, for when special circumstances arise that disrupts students' abilities to maintain their academic standing. We encourage students to use this resource if necessary.
- Useful Links:  
[Student Counseling by College](#), [Student Right and Responsibilities](#)

## GIS2114: The World & Big Data

Tentative Schedule (subject to change as instructor deems necessary):

Week	Module Title	Activities/Readings/Due Dates
Week 1	Introduction	<b>To Do:</b> Review the <i>Getting Started</i> module
		<b>HW:</b> Register for GEE account
Week 2	Geospatial Information & Big Data	Module 1 Readings & Videos
		<b>HW:</b> <a href="#">GIS Documentary</a> Write What You Think Activity (300 word reflection)
Week 3	Big Data & The 5 V's	Module 2 Readings & Videos
		<b>HW:</b> Critical Thinking Activity
Week 4	Types of Spatial Data	Module 3 Readings & Videos
		<b>HW:</b> Satellite Profile Activity
Week 5	Sources of Big Spatial Data	Module 4 Readings & Videos
		<b>HW:</b> Citizen Science Participation & Discussion Post
Week 6	Programming and Coding for GIS	Module 5 Readings & Videos
		<b>HW:</b> Quiz (covers Modules 1-5)
Week 7	Basics in (Spatial) Databases	Module 6 Readings & Videos <a href="https://www.purestorage.com/knowledge/what-is-an-open-source-database.html">https://www.purestorage.com/knowledge/what-is-an-open-source-database.html</a>
		<b>Begin Final Project; Schedule meeting with instructor.</b>
Week 8	Mid-term	Exam I Preparation; Take Exam in Canvas (Not proctored, but timed)
Week 9	Big Data Quality	Module 7 Readings & Videos
		<b>HW:</b> Module 7 Critical Thinking Activity
Week 10	Spatial Data Management & Storage	Module 8 Readings & Videos
		<b>HW:</b> Module 8 Quiz
Week 11	Visualizing Big Data	Module 9 Readings & Videos
		<b>HW:</b>
Week 12	Geospatial Techniques with Big Data (Machine Learning, AI)	Module 10 Readings & Videos
		<b>HW:</b>
Week 13	The Future of AI & Geospatial Science	Module 11 Readings & Videos
		<b>HW:</b> Exchange Final Projects for Peer Review
Week 14	Geospatial Data & Privacy Rights	Module 12 Readings & Videos
		<b>HW:</b> Class Discussion Post
Week 15	Final Exam	Prepare for Exam II; <b>Peer Review of Final Project Due</b>