

Special Topics – Extreme Atlanta: Climate Change in Urban Spaces
EAS 4803/8803 and BIOL4813/8813 (3 credit hours)
Fall 2019

Lecture Meeting Time: 1:55 PM – 2:45 PM Mondays and Wednesdays

Lab Meeting Time: 8:00 AM – 10:45 AM Thursdays

Lecture and Lab Location: L1105 ES&T

Instructors

Dr. Zachary Handlos

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Office Hours: Tuesdays 9-11am

Course Description

Global climate change is arguably the most significant issue of concern to global society within the 21st century. It has been scientifically demonstrated that Earth's climate is changing rapidly on decadal timescales and that anthropogenic forcing is the primary driver of these changes. While the general public attributes climate change simply to changes in CO₂ and temperature, the physical mechanisms and consequences associated with this issue span all of Earth, including the atmosphere, hydrosphere and lithosphere.

While this may seem like too large of a problem to solve as a society, there are a variety of strategies that have been implemented (or will be in the future) that will help combat global climate change and any negative consequences associated with this. This includes adaptation strategies, which are designed to address consequences of climate change that are inevitable (e.g., building sea walls to address sea level rise) as well as mitigation strategies, which are designed to minimize or negate changes to Earth's climate (e.g., carbon capture and sequestration).

Atlanta, GA is not immune to global climate change. With rapid urbanization occurring in this region along with other forcings tied to human actions, the city has been and will continue to be negatively impacted by changes to Earth's climate. This includes an increase in warmer-than-average temperatures, more extreme precipitation events and significant changes to ecosystems and biodiversity via human impacts.

In this unique *project-based interdisciplinary course*, students will be exposed to local problems within the greater Atlanta, GA region tied to global climate change. Students will investigate local impacts in the context of atmospheric, hydrological and land processes on the city, including a detailed look at the biological impacts to organisms in this region (including humans)! Through 3 module projects and a

final term project, students will learn about the consequences of climate change in the region and brainstorm adaptation and mitigation strategies to help combat and prevent such negative consequences.

Course Topics

This course will be divided into 3 modules, with each module covering about one-third of the course:

- 1) **Air** – Starting with an overview of the state of global climate change based on the IPCC 5th Assessment Report, global climate change will be introduced on a global scale and then zoomed in on the greater Atlanta, GA region with an emphasis on air quality. Students will conduct a project centered on constructing adaptation and mitigation strategies to tackle local air quality issues.
- 2) **Water** – This module will focus on the effects of climate change on the hydrological cycle, zooming in on local impacts to ecosystems within local water bodies. Students will take a field trip to Proctor Creek and work on an adaptation/mitigation project related to climate change impacts on this region.
- 3) **Land** – this module will focus on the relationship between urbanization, changes to land properties and global climate change. Students will be tasked with investigating the effects of urban “sprawl” within the greater Atlanta region and creating adaptation and mitigation strategies for addressing climate change issues tied to urbanization.

Course Projects

This course will contain 3 projects (one per module) and a final project which integrates all three units. Students will be expected to work in small groups (3-4 students) to generate projects relating to each theme’s module and provide updates per the schedule in the syllabus. Each project will define an issue within the module topic, provide data from existing city or scientific sources around their issue of choice, and propose a plan for mitigating the problem leveraging existing or emerging technologies. A 15-minute presentation will be given for class and guest-expert critique at the end of the module. The course final project will be similar, but slightly longer (20-minute) presentation, with the added task of integrating the Air, Water, and Land modules into one cohesive project. More information and a defined rubric for both the module and final project will be provided during the term.

Knowledge Outcomes

- Identify global climate change impacts to Atlanta, GA area
- Generate and propose adaptation and mitigation strategies that are testable in the Atlanta, GA area
- Interpret basic climate science and ecological data
- Articulate historical and sociological conditions shaping current climate change responses in city

Skill Outcomes

- Develop testable research questions/hypotheses
- Write a polished scientific report
- Communicate scientific information effectively to peers
- Quantitative climate science analysis
- Evaluate and critique primary peer-reviewed literature

Grading

The grade in this course will be based on student performance within the following categories:

Component	Undergraduate	Graduate
Module Projects	60% of grade (20% per project)	45% of grade (15% per project)
Term Project	25% of grade	25% of grade
In-class Participation	15% of grade	15% of grade
Career Assignment	NA	15% of grade (5% per module assignment)

Undergraduate vs. Graduate Performance

We expect all of you to become climate-literate students of Atlanta. That said, in addition to the requirements above, we are asking that graduate students investigate one career relevant to their degree that would apply to each module project they conduct. This could be a position in Sustainability for the City of Atlanta, a position at the EPA, etc. Graduate students will be asked to provide a description of the job and either 1) their resume and cover letter directed towards applying for such a job, OR 2) a synopsis (1-page) of an interview conducted with an official who holds that job.

Grading Scale

The **grading** for the course is as follows:

Grade	Percentage
A	100 – 90
B	89.99 – 80
C	79.99 – 70
D	69.99 – 60
F	<60

Depending on the distribution of student scores at the end of the course, the scores may be curved to reflect the scale described above (**up to the instructor’s discretion**).

Late Work Policy and Makeup Assignments

NO LATE ASSIGNMENTS are allowed in this course. Any late work will be graded as a “0”. All assignments must be completed and turned in to me ON TIME. Makeup assignments will only be allowed in extreme circumstances (e.g., serious illness, family emergency) as documented through the Dean of Students. Students are required to contact the course instructors at least 24 hours prior to an assignment due date and explain in full their request for a makeup assignment to be eligible to turn in an assignment beyond its due date.

Absences

The institute's excused absence policy will also be enforced in this course. See <http://www.catalog.gatech.edu/rules/4/> for details.

Academic Honor Code

The instructor and students are expected to abide by Georgia Tech's Academic Honor Code. Plagiarism of any kind (including the reproduction of materials found on the internet) is strictly prohibited and will be reported to the Office of Dean of Students for academic misconduct. The complete text of the Academic Honor Code may be found at: <https://policylibrary.gatech.edu/student-affairs/academic-honor-code>

Access and Accommodations

At Georgia Tech, we strive to make learning experiences as accessible as possible. If you anticipate or experience physical or academic barriers based on disability, you are welcome to let me know so that we can discuss options. You are also encouraged to contact the Office of Disability Services to explore reasonable accommodations.

The Office of Disability Services can be contacted by:

Phone: 404-894-2563

Email: dsinfo@gatech.edu

Website: <http://disabilityservices.gatech.edu/>

If class meets at a campus location: Please be aware that the accessible table and chairs in this room should remain available for students who find that standard classroom seating is not usable.

Acceptable Behavior and Technology Usage: You are expected to be engaged and respectful of others. When on campus or not, you represent Georgia Tech, and the guest speakers and access we have to resources can be cut off due to misbehavior. We also encourage you to bring your laptops, smartphones, tablets, etc. to class to take advantage of on-line research tools during class time. However, abusing this policy will result in receiving a 0 for the day for all assignments for any "technology infractions". These infractions include, but are not limited to, audible cell phone rings/alerts, on-line shopping, texting, Facebook, non-essential e-mail checking, and other activities unrelated to this class. No verbal warnings. No exceptions. This is for your learning AND safety.

Safety Concerns: The nature of this course allows us to conduct our work in the classroom that this the City of Atlanta. Because of this, we may have specific safety instructions to follow, particularly on Thursdays for the lab portion of the course. Below are general guidelines to be aware of, but note that we may need to add to these safety requirements per the site visits we conduct.

1. **Please wear closed-toe, full-heel shoes when advised.** While indoor labwork may require that your legs and feet be completely covered, outdoor labs may be quite hot; for this reason, we recommend bringing a change of clothes and shoes if you intend to wear shorts or sandals. No matter your footwear, we advise shoes with good grip. **If you do not wear the appropriate garments, you will be sent home to change.** This is for your safety.

2. Please contact Dr. Weigel to confidentially inform her of any health issues which may impact your engagement in lab or at field sites. These include any severe allergies (such as to bees or grass) or other major health concerns. This is so that she may make safety arrangements.
3. Please ask if you do not know how to operate any equipment. You can break equipment and hurt yourself if you do not know what you are doing. When in doubt, always ask!
4. Notify your instructors immediately if you are injured or lab equipment has been damaged.
5. Always be prepared for inclement weather when we have outdoor work scheduled – bring rain gear, hat, layers, etc. as necessary. **When raining, you will be expected to do activities that involve your hands – merely bringing an umbrella will make it difficult to work and stay dry!** Invest in or borrow a rain jacket for the semester.
6. We recommend you bring a water bottle, use sunscreen, wear a hat, and wash your hands after outdoor work. You may also choose to wear bug repellent or spray sunscreen, but please do not apply it before getting to the field site. Watch for poison ivy and check for ticks after outdoor activities, particularly field work in brush.
7. Please note that handguns are not permitted in state vehicles, in accordance with the [Georgia Fleet Management Manual](#). The right for permit holders to carry a concealed handgun extends only to USG-owned or leased property. It does not extend to locations of field trips or other outings. Please note the course schedule and plan appropriately.

Amendments: Your instructors reserve the right to make changes as severe weather and other factors necessitate. Any changes will be accompanied by advanced notice from the instructors.

Course Schedule:

Week	Date	Day	Module	Lecture topic	Lead
1	8/19/19	M	ALL	Class Introduction	EW and ZH
	8/21/19	W	ALL	Environmental Problems in Atlanta	ZH
	8/22/19	R	Air	On-site Visit and SLS	ZH
2	8/26/19	M	Air	Guest Lecture: Garry Harris- VA as Case Study	ZH
	8/28/19	W	Air	The Science of Air	ZH
	8/29/19	R	Air	On-site Visit	ZH
3	9/2/19	M	---	<i>Labor Day (No Class)</i>	---
	9/4/19	W	Air	Project Working Time	ZH
	9/5/19	R	Air	Smart Cities On-Campus Conference	Conference Presenters
4	9/9/19	M	Air	Project Working Time	ZH
	9/11/19	W	Air	Project Working Time	ZH
	9/12/19	R	Air	Project Working Time + Present Updates	Students
5	9/16/19	M	Air	Project Working Time	ZH
*	<u>9/17/19</u>	<u>T</u>	<u>Linked Courses</u>	<u>Opening Workshop: 11am-12pm, Atrium 1, ES&T Building</u>	<u>SLS</u>
	9/18/19	W	Air	Project Working Time	ZH
	9/19/19	R	Air	Project Presentations	Students
6	9/23/19	M	Water	Module Introduction	EW
	9/25/19	W	Water	What's Water?	EW
	9/26/19	R	Water	Visit to Agnes Scott: Sustainable Campus	EW
*	<u>9/28/19</u>	<u>S</u>	<u>Linked Courses</u>	Community Visit in Grove Park: TBD (optional)	<u>SLS</u>
7	9/30/19	M	Water	Water and Society: Al Bartell	EW
	10/2/19	W	Water	Project Working Time	EW
	10/3/19	R	Water	On-site Presentation and work, Justine Schwartz	EW
8	10/7/19	M	Water	Project Working Time	EW
	10/9/19	W	Water	Project Working Time	ZH
	10/10/19	R	Water	Project Working Time	ZH
9	10/14/19	M	---	<i>Fall Break (No Class)</i>	---
	10/16/19	W	Water	Project Working Time	EW
	10/17/19	R	Water	Project Working Time + Present Updates	Students
10	10/21/19	M	Water	Project Working Time	EW
	10/23/19	W	Water	Project Presentations	Students
	10/24/19	R	Land	The Built Environment: Drones, Javier Irizarry	EW
*	<u>10/25/19</u>	<u>F</u>	<u>Linked Courses</u>	<u>Midterm Gathering: 3pm-4:30 Location TBA</u>	<u>SLS</u>
11	10/28/19	M	Land	Module Introduction	EW
	10/30/19	W	Land	Land and Climate Change: Losing our Footing	EW

	10/31/19	R	Land	On-site Visit	EW
12	11/4/19	M	Land	Final Project Introduction and Working Time	EW
	11/6/19	W	Land	Project Working Time	EW
	11/7/19	R	Land	On-site Visit	EW
13	11/11/19	M	Land	Project Working Time	EW
	11/13/19	W	Land	Project Working Time	ZH
	11/14/19	R	Land	Project Working Time	ZH
14	11/18/19	M	Land	Project Working Time + Present Updates	Students
	11/20/19	W	Land	Project Working Time	EW
	11/21/19	R	Land	Project Working Time	EW
*	<u>11/21/19</u>	<u>R</u>	<u>Linked Courses</u>	<u>Closing Workshop: 6-7pm, Atrium 1, ES&T Building</u>	<u>SLS</u>
15	11/25/19	M	Land	Project Presentations	Students
	11/27/19	W	---	<i>Thanksgiving Break (No Class)</i>	---
	11/28/19	R	---	<i>Thanksgiving Break (No Class)</i>	---
16	12/2/19	M	Summary	Wrap-Up Day + Final Project Working Time	EW and ZH
	12/9/19	M	FINAL	Meet for Final Project Presentations 2:40pm-5:30pm	Students

Campus Resources for Students

In your time at Georgia Tech, you may find yourself in need of support. Below you will find some resources to support you both as a student and as a person.

Academic support

- Center for Academic Success <http://success.gatech.edu>
 - 1-to-1 tutoring <http://success.gatech.edu/1-1-tutoring>
 - Peer-Led Undergraduate Study (PLUS) <http://success.gatech.edu/tutoring/plus>
 - Academic coaching <http://success.gatech.edu/coaching>
- Residence Life's Learning Assistance Program
<https://housing.gatech.edu/learning-assistance-program>
 - Drop-in tutoring for many 1000 level courses
- OMED: Educational Services (<http://omed.gatech.edu/programs/academic-support>)
 - Group study sessions and tutoring programs
- Communication Center (<http://www.communicationcenter.gatech.edu>)
 - Individualized help with writing and multimedia projects
- Academic advisors for your major
<http://advising.gatech.edu/>

Personal Support

Georgia Tech Resources

- The Office of the Dean of Students: <http://studentlife.gatech.edu/content/services>; **404-894-6367**; Smithgall Student Services Building 2nd floor
 - You also may request assistance at https://gatech-advocate.symphlicity.com/care_report/index.php/pid383662?
- Counseling Center: <http://counseling.gatech.edu>; **404-894-2575**; Smithgall Student Services Building 2nd floor

- Services include short-term individual counseling, group counseling, couples counseling, testing and assessment, referral services, and crisis intervention. Their website also includes links to state and national resources.
- *Students in crisis may walk in during business hours (8am-5pm, Monday through Friday) or contact the counselor on call after hours at 404-894-2204.*
- Students' Temporary Assistance and Resources (STAR): <http://studentlife.gatech.edu/content/need-help>
 - Can assist with interview clothing, food, and housing needs.
- Stamps Health Services: <https://health.gatech.edu>; **404-894-1420**
 - Primary care, pharmacy, women's health, psychiatry, immunization and allergy, health promotion, and nutrition
- OMED: Educational Services: <http://www.omed.gatech.edu>
- **Women's Resource Center: <http://www.womenscenter.gatech.edu>; 404-385-0230**
- **LGBTQIA Resource Center: <http://lgbtqia.gatech.edu/>; 404-385-2679**
- **Veteran's Resource Center: <http://veterans.gatech.edu/>; 404-385-2067**
- **Georgia Tech Police: 404-894-2500**