

# Planet Earth: Wind, Water, and Fire

## GEOG/ENVR 250



***Instructor:***

Todd Lookingbill (he/him/his)

***How to reach me:***

Office hours: Wednesdays noon-1:00 pm or MW after class

Carole Weinstein International Center Room 311

Pop in or if you know ahead of time you'd like to chat at a specific time, email me first

Email: [tlooking@richmond.edu](mailto:tlooking@richmond.edu)

***Course schedule and attendance:***

Lecture: MW, 9:00-10:15, GOTW A100

Lab: F, 9:00-11:40, GOTW E305

***Now, what is this course about?***

The Earth is changing in unprecedented ways. This course introduces the characteristics and interrelationships of the Earth's climates, landforms, soils, and natural vegetation, with special emphasis on human relationships with their environment. A geographic approach emphasizes interconnectedness and spatial components of these relationships. The subject matter is particularly relevant to current social and scientific interest in global climate change and the spatial inequalities in environmental pollution and resources that benefit some communities and disadvantage others. The course is divided into five units: (1) concepts and tools of physical geography, (2) air (wind), (3) water, (4) landforms (fire), and (5) biodiversity.

We will take a systems perspective and sequentially study each of these separate systems in turn, emphasizing linkages between the Earth's systems. Human and other components of the biosphere will be discussed throughout the semester. The material is global in scale, though we will illustrate many of the concepts using local examples from campus and the city of Richmond.



***Are you taking this course to fulfill your Field of Study Natural Science Biological Sciences (FSNB) requirement?***

The field of natural science is concerned with the physical universe from subatomic to cosmic levels of organization, including inanimate as well as living systems, their structure, diversity, interaction, and evolution. Based upon the generation and testing of hypotheses, scientific inquiry is restricted to the study of repeatable, measurable, and verifiable phenomena. Within this field, knowledge may be gained either by controlled experiment or diligent observation, depending upon the phenomena being studied. Similarly, some of the field's methodologies rely upon quantitative analysis, while others are primarily qualitative. The natural science requirement is designed to enhance your appreciation of the beauty of science as well as your understanding of the challenges of doing science. Through this course you will gain experience in the formulation and testing of hypotheses and be introduced to scientific methodology.

***Course Materials:***

The required textbook for the course is *Geosystems Core, 1<sup>st</sup> Edition*. 2017. Robert W. Christopherson, Stephen Cunha, Charles E. Thomsen, Ginger Birkeland. Pearson. ISBN: 978-0321834744. There are multiple versions available in the book store and online. Feel free to shop around to find your best price. Additional readings from other sources will be assigned during the semester. These readings will be accessible through the course web page.

The web site for the class can be found on Blackboard: <http://blackboard.richmond.edu/>

Lab material also will be available on Blackboard. Some labs require additional material and you will be notified of these requirements ahead of time.

***How can you earn the 1000 points that make up your final grade?***

**500pts Exams**

The course grade will be based in part on two mid-terms and the final exam. Mid-term exams will combine short answer, fill-in, multiple choice, and three to four half-page essay questions. Each mid-term will be worth ~12.5% of the final grade (the first exam is worth slightly less than the second exam). If you must miss an exam for a legitimate, documented reason you must inform me ahead of time to schedule a make-up. Missing a mid-term exam without pre-approval will result in a zero for that assignment.

The final exam will be cumulative but will emphasize the biosphere section of the course. The format of the final exam will be similar to the two mid-term exams. The final exam will be worth 20% of your grade. Labs are intended to reinforce lecture material and provide a deeper understanding of geographic principles. The material from lab exercises therefore may also be included in the exams, though the majority of questions will come directly from the lecture portion of the class.

### **250pts Laboratory exercises**

Labs are intended to be inquiry driven exercises that focus on scientific methods including the development of testable hypotheses. This is an interactive, hands-on course and students are expected to work out laboratory exercises with the help of the lab material, textbook and lecture notes. There will be a short introduction preceding each lab; this is an excellent opportunity to ask any questions or ask for clarification. To get the most out of the labs, it is imperative that you read over the assignment before coming to class; there may be a short quiz at the beginning of the period as an accountability check on this preparation.

Many of the labs require data to be submitted electronically at the conclusion of the lab period. Some of the labs will involve working in pairs or groups. There will also be homework components to many of the labs including formal lab write-ups that will be completed as homework assignments. *For homework, feel free to ask questions of me and your classmates or work together on general concepts, but all written work should be completed on your own and follow the Honor Code:*

<https://studentdevelopment.richmond.edu/student-handbook/honor/pdfs/statutes.pdf>

### **100pts Class participation**

Class participation is absolutely essential to keeping up with the material, and is worth 10% of your grade. Participation includes active engagement in both full-class and small-group exercises. These exercises and homeworks are evaluated on a pass/fail basis based on whether you complete the assignments. So if you miss class for an unexcused absence, you automatically miss any relevant assignments that day too. These assignments can not be made up unless your absence is excused by the instructor before class.

Homework assignments will include attendance at a minimum of three external presentations offered during the semester (dates of talks are provided in the ClassSchedule document, which is continuously updated). If you can not make at least three of these scheduled talks, I can provide make-up opportunities as long as you let me know before Fall Break. No make-up opportunities will be provided if you do not make a request before Fall Break. Extra credit will be provided for attendance at additional presentations. To confirm attendance at a talk, a short (one-paragraph) essay must be submitted to the relevant thread on the Blackboard/Discussion Board relating some part of the presentation to the theory and practice of physical geography discussed in class. Write-ups should also include one question that you have for the speaker (*I encourage you to also ask the question at the presentation*).

As the last part of the class participation grade, you must find and review 3 different physical geography stories from different media sources and post responses to 2 of the stories identified by your classmates:

1. **One popular press story** - these stories can come from a newspaper, magazine, radio, or television. These should be about relevant events going on in the world (e.g., earthquakes, hurricanes, meteor strikes, droughts....). Post to the relevant Blackboard/Discussion board, a one paragraph summary and one paragraph interpretation of the significance of the story to Earth's systems. Include a link to the story. The story must be from within the past 7 days.
2. **One scientific article** - these stories should be about a new scientific study that came out relevant to Earth's Systems. I recommend finding a relevant news story about the study and then tracking down the primary reference to learn more. Include a citation to the study itself (e.g., an article in the journal Nature) rather than the news study writing about it. The study must be from within the past 1 month.

Once you have posted your summary, you can present the summary in class. Your in-class presentation should include one slide with a graphic that summarizes the main finding, which should be emailed to me before class on the day you would like to present. You will have a strictly-timed one to two minutes to present your story, so you should rehearse beforehand to make sure you can succinctly communicate a summary and interesting element of the story that you can clearly link to our course content. One summary allowed per week, and two oral summaries total required by the end of the semester.

3. **One geography related website** - the site should not be merely a news story about geography but an entire website dedicated to some principle that we discussed in class. This two-paragraph summary should include a photo and be posted to our course blog <http://blog.richmond.edu/geog250/>. There are lots of examples already posted here from prior years. Please categorize your entry as "Fall 2022" and into one or more of the following categories: "Atmosphere, Biosphere, Hydrosphere, Lithosphere, and Tools of the Geographer".
4. Part of your participation grade also includes listening to and responding to the in-the-news stories that your classmates present. In addition to posting your own summaries, you must review and post comments (at least three sentences) on at least 1 news/scientific study entry that was posted by your classmates on Blackboard and 1 website entry on our class blog site. Feel free to comment on more than two entries and the three people that post the most comments will receive extra credit on the final exam (1, 2, and 3 points, respectively). All comments are due by midnight Friday on the last week of class.

News stories will not be covered in the mid-term exams, but may be included in the final exam as they reinforce concepts covered in the course.

### 125pts Online reading quizzes

Weekly online quizzes will be evaluated as an accountability check for the reading assignments. These quizzes, which will be administered on Blackboard, will be brief, multiple choice and short answer questions and will be open book. Quizzes will generally be due Monday nights, at which point the quiz shuts down. You can take the quiz as

many times as you like, and only your final answers will be graded. You can not complete a quiz after the deadline has passed.

### **25pts New Zealand presentation**

This year's [International Education Week](#) is focused on New Zealand. This amazing country provides abundant opportunity to illustrate the physical geography and human-physical interactions that we will be learning this semester. We will have a group-based project during International Education Week in which you must document linkages between the country's geography and at least one of the Earth's systems studied in class. Project will include an oral presentation and a 250-word written summary. Project groups should also sign up for the EcoChallenge that week; extra credit will be given to the groups that score the highest from our class in the EcoChallenge (1, 2, and 3 points, respectively for the top three teams).

### **Final grades will therefore be calculated out of a 1000 pts as follows:**

(250 pts total) two in-class mid-terms  
 (250 pts) Cumulative final exam (emphasizing the biosphere)  
 (250 pts) Laboratory assignments  
 (100 pts) Class participation  
 (125 pts) Online quizzes  
 (25 pts) New Zealand presentation

- The grading scheme will follow standard University of Richmond guidelines (<http://registrar.richmond.edu/services/policies/grading.html>).

A > 93 pts	B 87-83	C 77-73	D 67-63
A- 93-90	B- 83-80	C- 73-70	D- 63-60
B+ 90-87	C+ 80-77	D+ 70-67	F < 60 pts

### ***Academic Honesty:***

The strength of the university depends on academic and personal integrity. In this course, you must be honest and truthful. Ethical violations include cheating on exams, plagiarism, reuse of assignments, improper use of the Internet and electronic devices, unauthorized collaboration, alteration of graded assignments, forgery and falsification, lying, facilitating academic dishonesty, and unfair competition. Report any violations you witness to the instructor. <https://studentdevelopment.richmond.edu/student-handbook/honor/pdfs/statutes.pdf>

### ***Time-on-Task Expectations:***

To be successful in this course, you should expect to devote an average of 10-14 hours each week reading for class and conducting online quizzes (2-3 hours), participating in class and lab sessions (5 hours), completing lab exercises at home (2-4 hours), and studying for exams, completing In-the-News, New Zealand, and other homework assignments (1-2 hours). These are all average values for the entire semester; some weeks will require greater effort in some areas and less effort in others.



If you experience difficulties in this course, do not hesitate to consult with me. There are also other resources that can support you in your efforts to meet course requirements.

**Academic Skills Center** ([asc.richmond.edu](http://asc.richmond.edu)): Academic coaches assist students in assessing and developing their academic and life-skills (e.g., critical reading and thinking, information conceptualization, concentration, test preparation, time management, stress management, etc.). Peer tutors offer assistance in specific subject areas (e.g., calculus, chemistry, accounting, etc.) and will be available for appointments in-person and virtually. Peer tutors are listed on the ASC website.

**Email** [Roger Mancastropa \(rmancast@richmond.edu\)](mailto:rmancast@richmond.edu) and [Hope Walton \(hw Walton@richmond.edu\)](mailto:hw Walton@richmond.edu) **for coaching appointments in academic and life skills.**

**Boatwright Library Research Librarians:** ([library.richmond.edu/help/ask/](http://library.richmond.edu/help/ask/) or 289-8876): Research librarians help students with all steps of their research, from identifying or narrowing a topic, to locating, accessing, evaluating, and citing information resources. Librarians support students in their classes across the curriculum and provide individual appointments, class library instruction, tutorials, and [research guides](http://libguides.richmond.edu) (libguides.richmond.edu). Students can [contact an individual librarian](http://library.richmond.edu/help/liaison-librarians.html) (library.richmond.edu/help/liaison-librarians.html) or ASK a librarian for help via email ([library@richmond.edu](mailto:library@richmond.edu)), text (804-277-9ASK), or [chat](http://library.richmond.edu/chat.html) (library.richmond.edu/chat.html). Geography's dedicated librarian is Samantha Guss ([sguss@richmond.edu](mailto:sguss@richmond.edu)).

**Career Services:** ([careerservices.richmond.edu](http://careerservices.richmond.edu) or 289-8547): Can assist you in exploring your interests and abilities, choosing a major or course of study, connecting with internships and jobs, and investigating graduate and professional school options. We encourage you to schedule an appointment with a career advisor early in your time at UR.

**Counseling and Psychological Services:** ([caps.richmond.edu](http://caps.richmond.edu) or 289-8119): Assists currently enrolled, full-time, degree-seeking students in improving their mental health and well-being, and in handling challenges that may impede their growth and development. Services include brief consultations, short-term counseling, skills-building classes, therapy groups, crisis intervention, psychiatric consultation, and related services.

**Disability Services:** ([disability.richmond.edu](http://disability.richmond.edu)): The Office of Disability Services works to ensure that qualified students with a disability (whether incoming or current) are provided with reasonable accommodations that enable students to participate fully in activities, programs, services and benefits provided to all students. Please let your professors know as soon as possible if you have an accommodation that requires academic coordination and planning.

**Speech Center:** ([speech.richmond.edu](http://speech.richmond.edu) or 287-6409): Assists with preparation and practice in the pursuit of excellence in public expression. Recording, playback, coaching and critique sessions are offered by teams of trained student consultants. During scheduled [appointments](#), consultants assist in developing ideas, arranging key points for more effective organization, improving style and delivery, and handling multimedia aids for individual and group presentations. We look forward to meeting your public speaking needs.

**Writing Center** ([writing.richmond.edu](http://writing.richmond.edu) or 289-8263): Assists writers at all levels of experience, across all majors. Students can schedule appointments with trained writing consultants who offer friendly critiques of written work.



### Class Schedule

This schedule will be followed approximately. Some changes may be made as the class proceeds but the exam dates will not change. Time permitting, we will conclude each major section with an in-class review. Chapter readings in *Geosystems Core* textbook provided in parentheses.

#### Unit:            Week of:            Topics covered:

INTRODUCTORY MATERIAL - Concepts and Tools of Physical Geography

Week 1:            Aug 22            Introduction to course and Earth's Systems. Definitions. Science of Geography. Systems components, interactions, dynamics & feedbacks. Tools of the Physical Geographer: Maps. Remote sensing. GIS. GPS. Earth geometry. Map projections and spatial coordinates. Scale. Scientific method. (Ch. 0 – introduction chapter)

Lab: *Scientific Method, Mapping Fundamentals and Eco-Corridor Introduction*

Assignments: Spatial Coordinates and Landsat Homework to be completed before class on Wed (Submit Landsat write-up to Blackboard Discussion Board)

Scientific Method homework by Friday (submit in Week 1/Lab folder on Blackboard)

Reading Quiz (located in Week 1/Homework folder; Due Friday Aug 26, 10:00 pm)

#### THE ATMOSPHERE (WIND)

Week 2:            Aug 29            The Earth in the Solar System. The Sun, Energy, and the Electromagnetic Spectrum. Seasons. Radiation Balance. Atmospheric Composition and Structure. Pollution: Ozone (Ch. 1)

Lab: *Particulate Matter Mapping* (field component)

Assignments: Reading Quiz; please note there are two short quizzes for this week:

Chapter 1a (Due Monday, Aug 29 at midnight)

Chapter 1b (Due Wednesday, Aug 31 at midnight)

Research on ozone due to Blackboard before class on Wednesday

Week 3:            Sept 5            Energy and Temperature. Global Temperature Patterns Human Influences on Temperature. Urban Heat Island Effect. (Ch. 2)

Lab: *Particulate Matter Mapping* (GIS component)

Assignments: Reading Quiz; Ozone (Due Sept 6, 10:00 pm), Chapter 2 (Due Sept 8, 10:00 pm)

Week 4: Sept 12 Global Pressure Patterns. Upper Atmospheric Circulation. Local Regional Winds. (Ch. 3)

Lab: *Albedo and the Urban Heat Island*

Assignments: Reading Quiz; Chapter 3 (Due Wed, Sept 15, 10:00 pm)

Read New York Times article about Richmond UHI before lab (link is in Lab folder)

Research on UHI due to Blackboard before lab on Friday

Air Quality lab Introduction Write-up and Map due before lab on Friday

Week 5: Sept 19 REVIEW and FIRST EXAM

Lab: *Review of Scientific Method Homeworks, Excel Tutorial, Introduction to Statistical Hypothesis Testing, and Discussion of Final Projects*

### THE HYDROSPHERE (WATER)

Week 6: Sept 26 Atmospheric Water and Weather. Clouds. Precipitation processes. Fronts and air masses. Hurricanes. Midlatitude cyclones. (Ch. 4)

Lab: *Little Westham Creek Restoration (field component)*

Assignments: Reading Quizzes; Chapter 4 (Due Sept 26, midnight)

Albedo Write-up due to Blackboard before lab

Week 7: Oct 3 Water Resources. Hydrologic cycle. Distribution of Earth's water. Watersheds. Water supply and demand. Water balance. (Ch. 5)

Lab: *Little Westham Creek Restoration (GIS component)*

Assignments: Chapter 5 Reading Quizzes (Due Oct 3, midnight)

Cape Town Water Crisis Assignment due to Blackboard before Wed class

Week 8 (FALL BREAK): Oct 10 Global Climate and Climate Change (Ch. 6-7)

Lab: *Invasive Species Management at Huguenot Flatwater*

Assignments: Little Westham Creek METHODS and RESULTS write-up due before lab on Friday  
4 iNaturalist observations due by the end of the day Friday

Extra Credit Reading Quiz Chapter 7 (Due Wed Oct 12, midnight)

### THE LITHOSPHERE (FIRE)

Week 9: Oct 17 Introduction to the Lithosphere. Geologic structure of the Earth. Geologic cycles. Plate tectonics. Mountain building. Endogenic Processes. Crustal formation/deformation processes. (Ch. 8)

Lab: *Campus Tree Diversity and Carbon Storage (field component)*

*Part 1 Tree Identification Quiz on Friday in lab*

Assignments: Chapter 8a Reading Quiz (Due Oct 17, midnight)

Plate Tectonics Evidence Assignment due to Blackboard before class on Wednesday

Week 10: Oct 24 Earthquakes and Volcanism (Ch. 8 cont.)

Lab: *Campus Tree Diversity and Carbon Storage (GIS component)*

*Part 2 Tree Identification Quiz*

Assignments: Chapter 8b Quiz (Due Oct 24 midnight)

Really, Big One Earthquake Assignment due before class on Wednesday



Week 11: Oct 31 Conclude Volcanism. Exogenic Processes. Soils, weathering and mass movement. Erosion, transport, and deposition. (parts of Ch. 9-12)

Lab: *Biogeography of Belle Isle Rock Pool (Field component)*

Assignments: Campus Trees lab write-up due before lab on Friday  
Chapters 9-12 Reading Quiz due Oct 31, midnight

Week 12: Nov 7 (go vote!) REVIEW and SECOND EXAM

Lab: *Biogeography of Belle Isle Rock Pool (GIS component)*

### THE BIOSPHERE AND EARTH LINKAGES

Week 13: Nov 14 Conservation biogeography. Ecosystems. Biodiversity.  
Species distributions in place and time (Ch. 13)

Lab: *Final Projects Data Analysis*

Assignments: Submit your Rock Pools worksheet before lab on Friday  
New Zealand Presentations

Week 14: Nov 21 (THANKSGIVING) Biomes. Biological gradients.  
Habitat loss and fragmentation. Island biogeography (Ch. 14)

Assignments: Chapters 13/14 Reading Quiz (Due Wed Nov 23, midnight)

Week 15: Nov 28 Wrap-up Biosphere and the semester

Lab: *Final Project Presentations*

Assignments: Submit Marine Protected Area Homework assignment before Wed class  
Final Labs presentations due Friday in class; write-ups due by 5:00 pm on Friday

All work including In-the-News postings must be submitted by **Friday, December 2 by midnight**

FINAL EXAM Friday, December 9th, 9:00 am - noon

EXTERNAL TALK OPPORTUNITIES (THESE WILL BE UPDATED AS MORE INFORMATION AVAILABLE AND NEW OPPORTUNITIES WILL BE POSTED AS THE ARISE)

**Tuesday, September 20, 2022**

5-7 PM, Jepson 118 - Geographers in Action. Current Senior Geographer Majors describe their internship, study abroad, research experience in a series of 8-minute talks. Food provided at mixer to follow.

**Wednesday, October 5, 2022**

[Kevin Bales](#)

Professor of Contemporary Slavery & Research Director, Rights Lab, University of Nottingham, UK

"How to Save the Planet by Ending Slavery (and Vice Versa)"

Whitehurst Living Room

7:00 p.m.

**Monday, October 17, 2022**

[Daniel Winkler](#), Research Ecologist, USGS Southwest Biological Science Center

"Climate change impacts in our National Parks"

12:00 p.m.

Gottwald Auditorium

*Co-Sponsored with the Biology Seminar Series*

**October 19-20, 2022**

[Sharon Lavinge](#)

Environmental Activist and Goldman Prize recipient

TBD

**Friday, November 4, 2022**

Panel Discussion and screening of [El Poder del Pueblo](#)

6:00 p.m.

*Co-sponsored with the Tucker-Boatwright Festival*

**Tuesday, November 15, 2022**

4:30-6 PM, Jepson, "Conserving and Restoring Biodiversity: From James River Sturgeon to New Zealand Kiwi Birds". Drs. [Matthew Balazik](#) (VCU, U.S. Army Engineer Research and Development Center) and [Kristina Ramstad](#) (USC Aiken) to speak about the highlighted species, in addition to a NZ conservation speaker (TBD) to speak more generally about the biodiversity decline in New Zealand and the role of introduced mammals. Part of International Education Week.

## **Planet Earth: Wind, Water, and Fire**

### **GEOG/ENVR 250 (Lab)**



Day and Time: Friday, 9:00-11:40  
Location: GOTW E305 or INTC 300 (will be announced in class each week)

Instructors: Todd Lookingbill  
Email: [tlooking@richmond.edu](mailto:tlooking@richmond.edu)

Additional GIS help is available from: Beth Zizzami  
[bzizzami@richmond.edu](mailto:bzizzami@richmond.edu)

#### Structure of the course

Labs are intended to be inquiry driven exercises that focus on scientific methods including the development of testable hypotheses. This is an interactive course and labs are generally not cookbook exercises but require the application of a creativity and persistence mindset to design your experiment, analyze the results, and present your finding. Laboratory work is intended to complement the lecture course by providing additional opportunities to work with the different tools available when studying earth systems and geography.

There will be a short introduction preceding each lab; this is an excellent opportunity to ask any questions of clarification. Many of the labs require write-ups to be handed in at the conclusion of the lab period. Most of these labs will involve working in pairs or small groups. Groups of students may work together on these assignments. There will also be several assignments that will be completed as homework assignments. For homeworks, students may ask each other questions but should work independently and submit their own independent write-up.

Attendance at labs is obviously critical. You **MUST** contact me via e-mail ahead of time if you will be missing class. Even if you inform me orally of your absence, I still need an e-mail from you. Unexcused absences will result in a zero for the assignment.

There will be four two-week lab assignments throughout the semester. In week one, we will collect field data using tools of the trade. In week two, we will analyze the data, usually within a Geographic Information System (GIS). These assignments include studies of air quality in the City of Richmond, water quality in Little Westham Creek, the diversity and carbon content of campus vegetation, and the spatial distribution of species in rock pools found at Belle Isle.

One of the primary learning objectives of this course is to learn how to write a scientific paper. Each lab ties into the system we will be studying in the classroom, and each of these assignments will focus on a different part of the scientific reporting process (intro/motivation writing, background library research, hypothesis development, methods development, creating maps and graphs, presenting results, and discussion of findings). Assignments become more involved as the semester progresses, building up to final projects that will be self-designed and include all parts of a standard scientific study.

There are also some smaller assignments interspersed throughout the semester during which we will get additional practice with the scientific method, mapping fundamentals, excel, hypothesis generation, and statistical hypothesis testing. The week of fall break we will also take a trip to the James River Park System at Huguenot Flatwater to explore the river and learn about the management of invasive plants by a local partnership including the University of Richmond.

Scientific reporting, both as reports and peer-reviewed journal articles, will be introduced, along with the specific tools to be used throughout the semester. These tools include ArcGIS for mapping and spatial analysis and Microsoft Excel for graphing and management of tabular data. We will also gain experience using GPS equipment to gather geospatial data in the field and with different types of field equipment used to measure air, water, soils, and vegetation. We will learn how data can be collected on your phone using apps such as iNaturalist and Arc Collector.

Data for several of the labs will be collected using campus as a living lab. At the beginning of each lab period during the first eight weeks, each of you also will get a week in which you share the identifying characteristics and an interesting factoid of two species of trees. Over time, we will build up this class list to over 30 species for a short identification quiz in weeks 9 and 10. Feel free to check in with me if you have any questions before it is your week to present. You can sign up now to present your trees on a specific date at <https://tinyurl.com/UR2022trees>

We will also visit several urban parks and landscapes around the City of Richmond. As part of these visits, we will be exposed to the variety of natural resource amenities provided by these areas and the types of stressors that they confront. We also will meet and participate in management activities with natural resource practitioners.

The last weeks of the semester will be spent in small project teams working on a self-designed final study to address hypotheses developed on your own related to the physical environment. A final lab report along with an oral assignment will be due at the completion of the course.

## Fall 2022 Lab Schedule (subject to change) 250 pts total

<u>Semester Week</u>	<u>Lab Date</u>	<u>Lab Topic</u>
01	8/26	<i>Scientific Method, Mapping Fundamentals and Eco-Corridor Introduction</i> – Meet in GOTW E305. View Eco-Corridor videos before lab.
<b>LAB UNIT 1: ATMOSPHERIC SYSTEMS (CITY OF RICHMOND)</b>		
02	9/2	<i>Particulate Matter Mapping (field component)</i> – We will be sampling off campus, so be prepared to be walking downtown and travel in a van. Meet at the Trailhead to the Eco-Corridor.
03	9/9	<i>Particulate Matter Mapping (GIS component)</i> – We will be in the Spatial Analysis Lab (INTC 300). Review Samantha Guss library tutorial and answer embedded questions before lab.
04	9/16	<i>Albedo and the Urban Heat Island</i> – Meet in GOTW E305. Particulate Matter INTRO Write-up due to Blackboard before lab.
05	9/23	<i>Excel Tutorial, Introduction to Stastical Hypothesis Testing, and Discussion of Final Projects</i> Try to complete the excel portion of the Albedo Lab before class (it is due next week) and I can answer any questions that you may have. Meet in the SAL (INTC 300).
<b>LAB UNIT 2: HYDROLOGIC SYSTEMS (CAMPUS)</b>		
06	9/30	<i>Little Westham Creek Restoration (field component)</i> – Meet in GOTW E305 to get waders and then we'll walk to Eco-Corridor together. Read instructions before lab. Albedo Write-up due to Blackboard before lab
07	10/7	<i>Little Westham Creek Restoration (GIS component)</i> – Meet in the Spatial Analysis Lab.
08	10/14	<i>Invasive species management and the James River Park System (Huguenot Flatwater Unit)</i> – Meet at Eco-Corridor trailhead. Make sure you have uploaded the <a href="#">iNaturalist</a> app to your phone by Wednesday's class. Read over iNaturalist instructions and join the hugflat project before lab. Your 4 observations from the lab should be submitted to iNaturalist by the end of the lab period Little Westham Creek METHODS & RESULTS write-up due to Blackboard before lab



### LAB UNIT 3: BIOLOGIC SYSTEMS (CAMPUS AND CITY OF RICHMOND)

9                                      10/21                      *Campus Tree Diversity and Carbon Storage (field component)* – Meet at Eco-Corridor trailhead.  
Part 1 Tree Identification Quiz

10                                      11/4                      *Campus Tree Diversity and Carbon Storage (GIS component)* – Meet in Spatial Analysis Lab. Post a scientific hypothesis that could be tested using the campus tree database and a completed Table 2 before lab.  
Part 2 Tree Identification Quiz

11                                      11/4                      *Biogeography of Belle Isle Rock Pool (field component)* – We will be sampling off campus, so be prepared to be scrambling on the rocks at Belle Isle and travel in a van. Meet at the Trailhead to the Eco-Corridor.  
Campus Tree Lab DISCUSSION write-up due before lab

12                                      11/11                      *Biogeography of Belle Isle Rock Pool (GIS component)* – Meet in SAL

### UNIT 4: FINAL PROJECTS

13                                      11/18                      *Final Projects Data Collection and Data Analysis* – Meet in SAL. Time to work on your final lab assignments. Collect data, get help with analyses, create your final map, whatever you need. You should have already posted your final lab hypothesis and an outline of your methods to the Blackboard Discussion Board before you begin collecting any day.

14                                      11/25                      *Thanksgiving Break*

15                                      12/2                      *Final presentations* – Meet in GOTW E305  
Final Lab Write-ups Due by **Friday, December 2 at 5:00 p.m.**