

# Syllabus

You can find the Google Doc for the syllabus [here](#)

([https://docs.google.com/document/d/191gp23azOdIOsoEdYfXpoKfBYxhNlznTYZ\\_dD8ScZRQ/edit?usp=sharing](https://docs.google.com/document/d/191gp23azOdIOsoEdYfXpoKfBYxhNlznTYZ_dD8ScZRQ/edit?usp=sharing))

**The syllabus is subject to change, but I will be sure to announce it if I do.**

## **BIO 303: Data-Intensive Ecology**

4 credit hours

Spring 2021

### **Instructor Contact Info:**

Jennifer Kovacs, Ph.D.

Email: [jkovacs@agnesscott.edu](mailto:jkovacs@agnesscott.edu)

### **Zoom link for office hours & meetings:**

General drop-in office hours: Mondays 2-3:30

Jennifer Kovacs' Personal Meeting Room

Join Zoom Meeting

<https://agnesscott.zoom.us/j/2479256282> [.\(https://agnesscott.zoom.us/j/2479256282\)](https://agnesscott.zoom.us/j/2479256282)

Meeting ID: 247 925 6282

### **Class Meetings/ Office Hours & Individual Meetings/ Workload Expectations:**

This class will be held asynchronously during the Spring of 2021. This means that we will not be meeting as a whole class during the scheduled class meeting times.

You will have weekly scheduled 20-minute one-on-one meetings with Dr. Kovacs to discuss your course progress and research questions.

Additionally, Dr. Kovacs will hold drop-in office hours from 2-3:30 on Mondays.

The ASC class Slack channel and the larger, multi-college Slack channel associated with the textbook are available 24/7 for discussion and assistance with assignments and programs.

The course is divided into 6 textbook modules and 7 mini-assignments that must be completed during the course of the semester. These modules and assignments are self-paced and do not have hard deadlines associated with them. However, I have included recommended completion dates for each graded assignment, which should pace the course.

I recognize that asynchronous learning can be difficult. Still, I encourage you to set goals and to see this course as a semester-long project, which we will be working on together throughout the semester.

With that in mind, **you should schedule 10 hours per week** to complete the assignments and to stay on track (some weeks may be more, others less, depending on how familiar you are with a module's content).

### **Catalog Description:**

This is a course-based undergraduate research experience (CURE) in ecological research, data analysis, and computational methods. Students will gain hands-on experience using multiple publicly available ecological data sets to generate their own authentic research questions in the fields of behavioral ecology, community ecology, biodiversity, conservation, and sustainability. Students will be exposed to and gain experience using R, Python, and spatial analysis software while completing and presenting a semester-long group research project.

### **Course Description:**

We live in a time where we can see a very real need for a basic understanding of ecological terminology, concepts, and methodologies to improve public policy and other ecological problem-solving decisions. Additionally, many of the methods and models used in ecology can be broadly applied across biology, other STEMM fields, and across the liberal arts curriculum. Across the field, there is a major push to incorporate computational thinking and an understanding of human social systems throughout the science curriculum. In ecology and other STEMM fields, basic programming and coding skills have become essential and marketable, as has the ability to mine and analyze large data sets.

This course in ecological research and computational methods will allow you to gain hands-on experience using multiple publicly available ecological data sets to generate and answer authentic research questions in the fields of behavioral ecology, community ecology, biodiversity, conservation, and sustainability. During the semester, you will be exposed to and gain experience using R, Python, and ArcGIS. All three of these languages/ programs are highly sought after in grad and professional students in various STEMM fields and entry-level positions in business, non-profits, and government. Additionally, this authentic research experience will give you practice in data wrangling, statistical analysis, teamwork, and scientific communication.

### **The basic structure of the course:**

You will individually develop and answer your own ecological research question during the semester using a small curated set of publicly available datasets. You will follow the modules throughout the semester and complete the assignments and mini-assignments. You will use either R or Python to analyze and answer your individual questions throughout the semester.

During weekly one-on-one meetings with Dr. Kovacs, you will work to identify, collect, and analyze data that would address an existing hypothesis/ problem in the field of ecology. Ultimately, you will present your findings to the larger Agnes Scott Community during SPARC in April. We will discuss other venues that may be appropriate for sharing your findings and work.

**Student Learning Objectives:**

-Students will collect and mine large open-access datasets from servers, files, websites, and citizen science projects.

-Students will analyze and visualize data from a variety of publicly available databases to test hypotheses and research questions using both R and Python programming platforms.

-Students will gain skills using spatial analysis software

-Students will conduct an authentic ecological inquiry, including:

- generating a testable hypothesis based on observations,
- designing an investigation with appropriate sampling selection and variables,
- collecting and analyzing data following the design, and
- interpreting results and drawing conclusions based on the evidence.

-Students will conduct a peer review to evaluate and provide feedback to others' work.

**Textbook and other materials:**

There is no required textbook for this course. Rather, I have adapted the open-source textbook "Passion Driven Statistics" and its videos and exercises to be delivered entirely within Canvas.

There will also be additional resources (both required and supplementary) posted within Canvas throughout the semester.

**Two additional freely available online textbooks that may be of interest:**

R for Ecologists: [http://ecology.msu.montana.edu/labdsv/R/labs/R\\_ecology.html#recol](http://ecology.msu.montana.edu/labdsv/R/labs/R_ecology.html#recol)  
([http://ecology.msu.montana.edu/labdsv/R/labs/R\\_ecology.html#recol](http://ecology.msu.montana.edu/labdsv/R/labs/R_ecology.html#recol))

Python for Ecologists: <https://datacarpentry.org/python-ecology-lesson/>  
(<https://datacarpentry.org/python-ecology-lesson/>)\_ [\(https://datacarpentry.org/python-ecology-lesson/\)](https://datacarpentry.org/python-ecology-lesson/)

**Semester Schedule:**

Module	Tasks	Suggested Completion By
Welcome & Mini-Assignment #1	<ul style="list-style-type: none"> <li>-Watch Dr. Kovacs Welcome video</li> <li>-Watch textbook video</li> <li>-Set up a weekly one-on-one meeting time</li> <li>-Setup Slack &amp; do 1 post</li> <li>-Access your lab notebook</li> <li>-Complete Mini-Assignment #1</li> </ul>	Jan 22
Getting Started with your Research Project	<ul style="list-style-type: none"> <li>-Watch Dr. Kovacs Video</li> <li>-Watch videos for DataSets and Codebooks (~25 min total)</li> <li>-Watch videos for Literature Review</li> <li>-Play "Research Roulette"</li> <li>-Look over course datasets</li> </ul>	Jan 29
<i>Cont.</i> Getting Started with your Research Project  Mini-Assignment #2	<ul style="list-style-type: none"> <li>-Complete Module Assignment "Writing your research question."</li> <li>-Mini-Assignment #2</li> </ul>	Feb 5
Writing Your First Program	<ul style="list-style-type: none"> <li>-Watch Dr. Kovacs Video</li> <li>-Pick a programming language for the semester</li> <li>-Install the program you've chosen</li> <li>-Watch videos for DataSets and Codebooks (~25 min total)</li> </ul>	Feb 12

	<ul style="list-style-type: none"> <li>- Complete the Module Assignment (Writing your first program)</li> <li>- Complete and submit mini-assignment #3 (Phenology)</li> </ul>	
Data Management	<ul style="list-style-type: none"> <li>- Watch Dr. Kovacs Video</li> <li>- Watch Videos for Data Management</li> <li>- Complete &amp; submit Module Assignment (Making Data Management Decisions)</li> </ul>	Feb 19
Data Visualization	<ul style="list-style-type: none"> <li>- Watch Dr. Kovacs Video</li> <li>- Watch Videos for Data Visualization</li> <li>- Complete &amp; Submit Module (Data Visualization)</li> </ul>	Feb 26
Mini-Assignment #4	<ul style="list-style-type: none"> <li>- Complete &amp; Submit Mini-Assignment 4</li> </ul>	March 5
Data Analysis Tools	<ul style="list-style-type: none"> <li>- Watch Dr. Kovacs Video</li> <li>- Watch Videos for Data Analysis Tools</li> </ul>	March 19 (Spring Break)
<i>cont.</i> Data Analysis Tools Mini-Assignment #5	<ul style="list-style-type: none"> <li>- Complete and Submit Module Assignments I, II, III, &amp; IV</li> <li>- Complete &amp; Submit Mini-Assignment #5</li> </ul>	March 26
Exploring Statistical Analysis	<ul style="list-style-type: none"> <li>- Watch Dr. Kovacs Video</li> <li>- Watch Videos for Exploring Statistical Interactions</li> <li>- Complete &amp; Submit Module Assignment (Statistical Interactions)</li> </ul>	April 2
Mini-Assignment #6	<ul style="list-style-type: none"> <li>- Complete &amp; Submit Mini-Assignment #6</li> </ul>	April 9

Final Projects	- Watch Dr. Kovacs Video -Prepare & submit a draft of your project presentation	April 16
Practice Presentations	- This week we'll schedule some group meeting times to practice our presentations and do some Q&A's	April 23
SPARC Tuesday	- Present at SPARC	April 26
Mini-Assignment #7	- Complete Mini-Assignment #7	May 5

### Grading Scale/ Assignment & Project Breakdown:

Mini-Assignments (6 total)@ 10 points each	60 points
Mini-Assignment #7	20 points
Module Assignments (9 total) @ 10 points each	90 points
Final Project w/ Sparc presentation	20 points
Weekly meeting & assessments (12 total) @ 5 each	60 points

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250 points

The following grading scale will apply for converting numerical grades into final letter grades:

- 93 to 100: A
- 90 to 92.9: A-
- 87 to 89.9: B+
- 83 to 86.9: B
- 80 to 82.9: B-
- 77 to 79.9: C+

73 to 76.9: C

70 to 72.9: C-

67 to 69.9: D+

63 to 66.9: D

60 to 62.9: D-

Lower than 50: F

**Academic honesty:** The Agnes Scott College honor code embodies an ideal of character, conduct, and citizenship, and is an important part of the College's mission and core identity. This applies especially to academic honesty and integrity. Passing off someone else's work as your own represents intellectual fraud and theft, and violates the core values of our academic community. To be honorable, you should understand not only what counts as academic dishonesty, but also how to avoid engaging in these practices. You should:

- review each course syllabus for the professor's expectations regarding course work and class attendance.
- attribute all ideas taken from other sources; this shows respect for other scholars. Plagiarism can include portraying another's work or ideas as your own, buying a paper online and turning it in as if it were your own work, or not citing or improperly citing references on a reference page or within the text of a paper.
- not falsify or create data and resources or alter a graded work without the prior consent of your professor. This includes making up a reference for a works cited page or making up statistics or facts for academic work.
- not allow another party to do your work/exam, or submit the same or similar work in more than one course without permission from the course instructors. Cheating also includes taking an exam for another person, looking on another person's exam for answers, using exams from previous classes without permission, or bringing and using unauthorized notes or resources (i.e., electronic, written, or otherwise) during an exam.
- not facilitate cheating, which can happen when you help another student complete a take home exam, give answers to an exam, talk about an exam with a student who has not taken it, or collaborate with others on work that is supposed to be completed independently.
- be truthful about the submission of work, which includes the time of submission and the place of submission (e.g., e-mail, online, in a mailbox, to an office, etc.).

You should understand that penalties result from dishonest conduct, ranging from failure of the assignment to expulsion from the college. You should speak with your professors if you need clarification about any of these policies.

**Title IX Statement:**

For the safety of the entire community, any incidence of or information about sexual misconduct must be reported immediately to Title IX Coordinator Marti Fessenden (mfessenden@agnesscott.edu, 404-471-6547) or Deputy Title IX Coordinator Karen Gilbert (kgilbert@agnesscott.edu, 404-471-6435).

**Inclusion Statement:**

This course adheres to the principles of diversity and inclusion integral to the Agnes Scott community. We respect people from all backgrounds and recognize the differences among our students, including racial and ethnic identities, religious practices, and gender expressions. We strive for our campus to be a safe space in which all students feel acknowledged and supported. At the same time, we understand that course content, critical inquiry, and classroom dialogues give us opportunities to examine topics from a variety of perspectives. Such discourse is a defining feature of a liberal arts education, and can compel debates that challenge beliefs and positions, sometimes causing discomfort, especially around issues related to personal identities. While we uphold and preserve the tenets of academic freedom, we request and invite your thoughtful and constructive feedback on ways that we can, as a community of learners, respectfully assist and challenge one another in our individual and collective academic work.

**Accommodations:**

Agnes Scott College seeks to provide equal access to its programs, services and activities for people with various abilities. If you will need accommodations in this class, please contact the Office of Academic Advising and Accessible Education (404-471-6150) to complete the registration process. Once registered, please contact me so we can discuss the specific accommodations needed for this course.