

Fall 2021, BIOL 5660 – Advanced Data Analytics, Section 89, 4hrs

Tuesday and Thursday 12:45 – 3:45pm

McCord Building Room 210

Faculty

Professor:	Christopher Gienger	Christopher Gentry
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Office Hours: Individual appointments can be scheduled for non-office hours.

Professor	Days	Times
Gienger	Monday through Friday	3:00 – 4:00pm
Gentry (SSC, D128)	Tuesday and Thursday	9:30 – 11:00am

Description and Objective

Course will cover contemporary techniques in biological data analysis, data science, and spatial modeling. Activities will leverage the R statistical computing language and students will gain an understanding of modern tools for collaborative work flows, including the R markdown language, and Git/Github for project version control.

Recommended Text

H. Wickham and G. Grolemund (2017) *R for Data Science: Import, Tidy, Transform, Visualize, and Model Data*. O'Reilly Media, Incorporated (<https://r4ds.had.co.nz/>)

A. Beckerman, D. Childs, and O. Petchey (2017) *Getting Started with R: An Introduction for Biologists*. Oxford University Press.

Attendance

In order to achieve the maximum benefit and grade in this course you should attempt to attend all lecture days. It is understandable, however, that illness can and will occur as well as other unfortunate situations that require you to miss a lecture. You will have one (1) week to complete a missing assignment or examination, after which all points are lost resulting in an automatic zero (0) for that assignment or examination (with valid, documented excuse).

Classroom Etiquette

Electronics such as cellular phones, tablets, laptops, etc. are not necessary in the classroom, but can be used if not creating a distraction and non-audible tones are selected at all times. If an emergency requires the use of such a device, please be courteous to the other students and quietly leave the room.

Academic and Classroom Misconduct

Students are expected to conduct themselves appropriately at all times. Academic and classroom misconduct will not be tolerated. Students must read the "Code of Student Conduct" in the new Student Handbook for an understanding of what will be expected of them within the academic setting. Policy 3:035 will be followed in reporting suspected academic misconduct.

Disability Policy

At any time during the semester a student who has a disability which may affect his/her academic performance is encouraged to make an appointment with me to discuss this matter, or you may contact Disability Services; telephone 221-6230; TTY 221-6278; fax 221-7102; www.apsu.edu/disability

Policy on Minors

Minors (any non-student under the age of 18) accompanying staff, faculty, students or visitors on campus are not permitted in the classroom.

In-Class Exercises

There will be twelve (12) in-class exercises worth 20pts per assignment. You will be allowed to use whatever means necessary to complete these exercises (classmates, internet, textbooks, etc.). However, your exercises must maintain some form of originality! The university's policies on plagiarism and academic dishonesty will be strictly enforced.

Semester Project

There will be a semester project for this course which will be due by December 5th. Further details regarding the project will be discussed during the third week of September.

Student Learning Outcomes

By the end of this course, students will:

- *Demonstrate* the ability to perform data management and statistical analysis using the R environment for statistical computing and online resources,

- *Design* effective written and graphical presentations to communicate the results of an analysis or process, and
- *Develop* the skills necessary to create repeatable, collaborative workflows for data analysis and versioning control.

Course Outline

Week	Topic	Date	Breaks & Exercises
1	Syllabus, Setup, Best Practices	08/24 & 08/26	Markdown
2	Git, GitHub, and GitHub.io	08/31 & 09/02	Exercise 1
3	Generalized Linear Models	09/07 & 09/09	Exercise 2
4	Linear Mixed Models	09/14 & 09/16	Exercise 3
5	Ordination	09/21 & 09/23	Exercise 4
6	Classification and Regression	09/28 & 09/30	Exercise 5
7	Model Selection & Interference	10/05 & 10/07	Exercise 6
8	Introduction to GIS	10/12 & 10/14	<i>Fall Break</i>
9	Basic Mapping	10/19 & 10/21	Exercise 7
10	Intermediate GIS	10/26 & 10/28	Exercise 8
11	Species Distribution	11/02 & 11/04	Exercise 9
12	Home Range Analysis	11/09 & 11/11	Exercise 10
13	Spatial Regression	11/16 & 11/18	Exercise 11
14	Raster Data	11/23 & 11/25	<i>Thanksgiving Break</i>
15	Terrain Analysis	11/30 & 12/02	Exercise 12

* The Instructor may alter the course schedule and procedures at any time without notification.

Course Assessment

Letter Grade	Points	Percentage
A	400 – 360	100 – 90%
B	359 – 320	89 – 80%
C	319 – 280	79 – 70%
D	279 – 240	69 – 60%
F	239 and below	59% and below

Grade Distribution

Item	Points per Item	Total Points
Attendance & Participation	1 * 100	100
In-Class Exercises	12 * 25	300
<i>Total Points</i>	-	400

COVID-19 Supplement

In accordance with CDC guidelines for higher education, as of August 11, 2021, regardless vaccination status, masks are required in any of the university's indoor facilities except for private offices, individual study/practice rooms, and residence hall rooms. Social distancing is not required. Vaccination is strongly encouraged and readily available, including at APSU's Boyd Health Services. Contact them at (931) 221-7107. If any student tests positive for COVID-19, or if an unvaccinated student is exposed to someone who has tested positive, that student must submit the [COVID-19 Self-Reporting Form](#). Any student exhibiting symptoms of COVID-19 should seek a test, must fill out the [COVID-19 Self-Reporting Form](#), and should not attend in-person classes while symptomatic. Visit the [APSU Coronavirus Dashboard](#) webpage for more information.