Scientific Data and Software Skills
GLY 4930/6932 Section: 1257/1357/5566/5567
Class Periods: W 8 (3:00 PM – 3:50 PM)+ F 7/8 (1:55 PM – 3:50 PM)
Location: WM 210 / Online
Academic Term: Spring 2021

Instructor:
Rene Gassmoeller
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Office Phone Number
Office Hours: W 9 (4:05 PM – 4:55 PM), Office: Williamson Hall 258, Office hours will be held via Zoom

Course Description
Lecture, conferences or laboratory sessions covering selected topics of current interest in modern geology.

Course Pre-Requisites / Co-Requisites
Three courses in geology or instructor permission.

Course Objectives
All geoscientific disciplines rely heavily on data acquisition and data processing, which today is done almost exclusively digitally. Additionally, modeling as a supporting tool is becoming more complex and there is significant concern about the quality of scientific data processing and software (caused by many and high-profile retractions). This course teaches the basic discipline independent skills to follow best practices for storing, processing, publishing and archiving geoscientific data. Additionally, it discusses recommended practices for the use of existing or self-written geoscientific software and scripts. All material can be applied to work in other courses and the participant's research projects and will be practiced hands-on during the course.

A basic understanding of handling files and directories on a computer is required, all further techniques will be taught in class. Experience with any programming language (e.g. Python, Matlab, R, C, Fortran) will be helpful, but is not required.

Materials and Supply Fees
None

Required Textbooks and Software
None

Recommended Materials
- https://www.earthdatascience.org/courses/intro-to-earth-data-science/
- https://carpentries.org/
- https://www.nature.com/articles/sdata201618
- https://journals.plos.org/ploscompbiol/article?id=10.1371/journal.pcbi.1005510
- https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.1001745

Course Schedule
Week 1:   Introduction / Technical Setup / Entry Survey
Week 2:   The relation between Science, Data, and Software / Basics of digital archiving and collaboration
Week 3:   Traditional data storage and archiving / Modern cloud collaboration techniques
Week 4:   Data storage and archiving in the digital age / Introduction to Python
Week 5:   Data formats for earth science / Plotting and data analysis in Python
Week 6:   The concept of FAIR data / Introduction to Git
Week 7:   Data policies for study and projects / Introduction to Github
Week 8:   Software and data / Collaborative work on Github
Week 9:   Software structure / IDEs and Debugging
Week 10:   Coding Style/ Indentation and Linters

Week 11:   Documentation / Documentation systems
Week 12:   Software reviews / Reviewing pull requests
Week 13:   Testing I / Continuous integration I
Week 14:   Testing II / Continuous integration II
Week 15:   Social aspects of scientific software projects / Exit Survey

Attendance Policy, Class Expectations, and Make-Up Policy

Hybrid teaching will require a computer (desktop or laptop) for online **and** in-class sections. All lectures and tutorials will be held as Zoom meetings. Attendance will not be monitored, but is highly suggested as there will be interactive discussions, Q&A sessions, and hands-on sessions. Homework assignments will be handed out on Fridays and are due on the next Friday. Late homework assignments will be downgraded by 1 point if the homework is completed at most 3 days late (Monday), later submissions will be downgraded by 3 points. Excused absences must be consistent with university policies in the Graduate Catalog and require appropriate documentation. Additional information can be found in Attendance Policies.

Evaluation of Grades

Assignment	Total Points	Percentage of Final Grade
Homework Sets (10)	10 each	100%

Grading Policy

Percent	Grade	Grade Points
94.0 - 100.0	A	4.00
90.0 - 93.9	A-	3.67
87.0 - 89.9	B+	3.33
84.0 – 86.9	B	3.00
80.0 - 83.9	B-	2.67
77.0 - 79.9	C+	2.33
74.0 – 76.9	C	2.00
70.0 - 73.9	C-	1.67
67.0 - 69.9	D+	1.33
64.0 - 66.9	D	1.00
61.0 - 63.9	D-	0.67
0 - 60.9	E	0.00

More information on UF grading policy may be found at:
UF Graduate Catalog
Grades and Grading Policies

Students Requiring Accommodations

Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the Disability Resource Center. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

Course Evaluation

Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students on the Gator Evals page.

University Honesty Policy

UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Honor Code specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Software Use

All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

Student Privacy

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see the Notification to Students of FERPA Rights.

Campus Resources:

Health and Wellness

U Matter, We Care:
If you or a friend is in distress, please contact umatter@ufl.edu or 352 392-1575 so that a team member can reach out to the student.

Counseling and Wellness Center: counseling.ufl.edu/cwc, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

Sexual Assault Recovery Services (SARS)
Student Health Care Center, 392-1161.

University Police Department at 392-1111 (or 9-1-1 for emergencies), or police.ufl.edu.

Academic Resources

E-learning technical support, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu.

Career Resource Center, Reitz Union, 392-1601. Career assistance and counseling.

Library Support, Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring.

Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers.

Student Complaints Campus

On-Line Students Complaints