GPGN 268 – Geophysical Data Analysis – Spring 2023

⚙️ Practical Information

Instructor: Bia Villas Boas (she/her). My last name is "Villas Boas" (not "Boas"), but I prefer that you call me by my first name (pronounced bee-a).
GitHub Handle: @biavillasboas
Email: villasboas@mines.edu
Class Meeting Time: Tu/Thu 9:30-10:45 AM
Class Location: Geomaker Space (Green Center 228)
Credit Hours: 3.0
Class Web Site: https://github.com/GPGN-268
Bia's Office Location: GC 255
Bia's Office Hours: TBD

Teaching Assistant: Seunghoo Kim (she/them)
GitHub Handle: @SeunghooKim
Email: seunghookim@mines.edu
Office Hours: TBD

🌎 Welcome to Geophysical Data Analysis!

This course focuses on open-ended problem-solving that requires combining teamwork and communication skills with modern computational tools to solve geophysical problems. You will learn best practices of scientific computing which will provide you with a solid foundation for tackling practical data analysis problems in all areas of academia, industry, and government. We will work on applied problems that emphasize data acquisition and processing based on knowing what new information is necessary to solve a problem and where to find the information efficiently. At the conclusion of the course, you will be able to

- Find, process, visualize, analyze, and interpret multiple flavors of geophysical data;
- Use Unix commands to work with files and directories;
- Identify common geoscience data formats and the best tools to handle them;
- Construct complete, well-structured programs in Python;
- Work in teams to solve geophysical problems and collaborate on projects through GitHub
- Practice reproducible research through version control, documentation, and metadata aggregation.

📆 Course Schedule:

You may find the course schedule here. Please keep in mind that this is a tentative schedule, and I anticipate changing it as we move through the material – monitor the course GitHub page for current topics and deadlines.

📚 Course Material

There is no required text for this course. As we move thorough the semester, course material and external resources will be made available on GPGN268-CORE

💻 Required Technology:

- Laptop (Mac, Linux, or Windows) with at least 6 GB of free disk space. Please come talk to me as soon as possible if you need help finding a laptop that you can use for the course.

- Web-access
- Canvas
- GitHub account. I recommend that you sign up for the GitHub Student Developer Pack. There are lots of free benefits for students.

📢 Course Communication:

Our main communication channel will be GitHub Discussions. There, you will find a private forum that is only available for you, your instructors, and classmates. That is *your* space for asking questions, discussing with your peers, exchanging resources, and keeping up to date with course announcements.

- If you have a question, please search for it first on the GitHub discussion board. If you can't find the answer there, I encourage you to post it using the Q&A category – if you feel comfortable doing so. This allows your peers (who likely have similar questions) to upvote your question, or to provide their own input.

You should not hesitate to seek help, and can do this in the following ways:

1. Ask questions in class. Never hesitate to ask, even if I have explained the material before. You can safely assume that if something is not clear to you, there are several classmates that have the same question. I can also answer questions related to projects/assignments during class.
2. Seek the help of the teaching assistant.
3. Drop by my office. On the first day of class, we will decide on a time slot for drop-in office hours. During that time, you are welcome to come by my office without an appointment. Outside of drop-in hours, you may schedule an appointment with me.

As an assistant professor at Mines, I have many other responsibilities in addition to teaching. I ask that you be respectful of my time. I only check my email twice a day (I don't mean emails from students, I mean *all* emails). This means that you can expect a one-day response turnaround during the week, but it might take several hours until you hear back from me. I don't check emails on weekends and holidays.

4. Please only use email to clarify simple questions. I will not provide extensive feedback on assignments or questions about class material through email (but would be happy to arrange a meeting time). If anything is not clear, or if you need help with anything, please ask in a timely way using any of the options above. ⚠ Please include **GPGN268** in the subject line of any email that you send to me.

🧱 Grading Policy:

My role as a teacher is to support you and provide a nurturing environment that focuses on your learning. Unfortunately, we are still in a system that requires that I assign you grades. Below is what will form the basis of your final grades. The goal is for this to reflect our success in achieving the learning outcomes of this class.

- **Class Engagement (20%).** The success of our class will hinge on active engagement from everyone in the classroom. During lectures, discussions, and active learning exercises, this entails coming to class having completed the assigned tasks, being engaged, asking questions, participating in exercises and demonstrations, and promoting class interaction. Outside of the classroom, this entails actively participating in GitHub Discussions, in the form of questions, comments, answers, and feedback. This is a holistic grade based on your conduct throughout the term. If you are worried or concerned about your class participation, I am happy to provide feedback throughout the semester.

- **Short assignments & quizzes (20%).** Throughout the semester you will have short take-home assignments and in-class quizzes. You should complete such assignments individually.

- **Data stories (30%).** After introducing the fundamentals of scientific computing, we will start to work with several types of geophysical data (around week 8). We will do that through short projects called "Data Stories" and a data analysis report will be due for each one of these projects. Submissions of Data Stories are individual, but you are welcome to discuss and collaborate with your peers on these projects. If you do so, you should explicitly list who participated in the discussion and what was their contribution.

- **Final Project (30%).** The course will culminate with a final group project. The goal of the final project is to assess your ability to work as a team to combine and apply the skills you have learned in class in the context of a real-world geophysics problem. Our class will mostly focus on tools for data analysis and visualization, so this must be the focus of your final project. We will discuss final projects in more detail in the first weeks of class. Each group will be expected to turn in a "Project Milestone" halfway through the semester, and submit a final project report and give a presentation to the rest of the class at the end of the term.

The numeric-to-letter grade scale is shown below:

Range	Letter Grade	Range	Letter Grade
>= 93.0	A	73.0–76.9	C
90.0–92.9	A-	70.0–72.9	C-
87.0–89.9	B+	67.0–66.9	D+
83.0–86.9	B	63.0-66.9	D
80.0–82.9	B-	60.0–62.9	D-
77.0–79.9	C+	<60	F

⏰ Late work

There are many items in this class that need to be handed in. In order to keep everything on schedule, I would like you to be sure to hand in assignments on time. If you anticipate difficulty completing an assignment on time, please contact me as early as possible to make arrangements. You will have a grace period of 24h after the due date to submit your work with a 10% penalization. My goal is that you succeed in this class, so If you're struggling to complete your assignments in time, please come talk to me.

The COVID Smart Classroom:

As new variants of COVID-19 continue to evolve, all campus community members are asked to make thoughtful choices about their health and be mindful that those choices will affect our whole community.

- Anyone experiencing COVID-19 symptoms should wear a mask, not report to work or attend classes, and get tested as soon as possible.
- Anyone experiencing respiratory symptoms—even after a negative COVID test—should remember there are many respiratory viruses circulating in our community. Please be considerate of others and wear a mask whenever you have any cold-like symptoms.
- Masking is one of the most effective ways to protect yourself and others, especially in indoor settings when community transmission levels are high. Please continue to respect an individual's decision to wear a mask even if it is not required. Masks are still required in the Student Health Center.
- Wash your hands frequently using soap and water or hand sanitizer.

If you test positive for COVID-19 (rapid antigen or PCR test):

- **Stay home for a minimum of five (5) days** and isolate yourself from others at home as directed by the CDC.

- **Communicate with your professors via email or the excused absence form** that you are ill or have tested positive for COVID-19. You should communicate this 5 day absenteeism to your faculty OR through the Student Life Excused Absence Process. Students can complete the Excused Absence here.
- For additional support, please reach out to one of the many resources on campus:
  - Academic support: Email CASA at casa@mines.edu.
  - Student Life Office: Excused absence (only if you must be away from class for more than three days).
  - Experiencing a mental/emotional challenge? Email Student Outreach and Support (SOS) at care@mines.edu or fill out a SOS Referral.

Absence Policy:

The Student Absences webpage outlines Mines's official policy regarding student absences. Our Mines default position is to trust students unless they give us a reason not to. Please think carefully before attempting to abuse this trust. As long as your number of short-term illnesses is low, we will not require anything beyond an email heads up to mark you as excused, and you can work through what you missed for your own understanding. However, if you end up requesting a large number of excused absences, suspicious absences, or opportunistic absences, then we may follow-up and require you to submit proof that you have worked through the missed material before excusing you (in part, to make sure you are not falling behind and not amidst a crisis). If we determine that you are violating the intent of this policy, then we will treat it as Academic Misconduct or a Code of Conduct matter.

Diversity and Inclusion:

At Colorado School of Mines, we understand that a diverse and inclusive learning environment inspires creativity and innovation, which are essential to the engineering process. We also know that in order to address current and emerging national and global challenges, it is important to learn with and from people who have different backgrounds, thoughts, and experiences.

Our students represent every state in the nation and more than 90 countries around the world, and we continue to make progress in the areas of diversity and inclusion by providing Diversity and Inclusion programs and services to support these efforts.

Disability Support Services:

The Colorado School of Mines is committed to ensuring the full participation of all students in its programs, including students with disabilities. If you anticipate or experience any barriers to learning in this course, please feel welcome to discuss your concerns with me. Students with disabilities may also wish to contact Disability Support Services (DSS) to discuss options to removing barriers in this course, including how to register and request official accommodations. Please visit their website for contact and additional information, or come talk to me. If you have already been approved for accommodations through DSS, please meet with me at your earliest convenience so we can discuss your needs in this course.

The Writing Center:

The Writing Center is a free academic support service available to all members of the campus community including undergraduate and graduate students. They can assist you at any stage of the writing process, from brainstorming to final revisions. You do not need a complete draft to make an appointment. Their consultants are experts in a variety of composition and communication fields, providing support as you work on projects such as lab reports, essays, collaborative papers, scholarly publications, thesis chapters, and oral presentations. Whether you are focusing on organization or sentence structure, the Writing Center can evaluate your individual needs and tailor each appointment so that you become a more effective and efficient communicator. The Writing Center is open Sunday through Friday for in-person and online appointments. To learn more about our services and to make an appointment, please visit the Writing Center website. For questions, please e-mail writing@mines.edu.

Discrimination, Harassment, and Title IX:

All learning opportunities at Mines, including this course, require an environment that allows each student to be able to learn without fear of discrimination or harassment based on any protected class. Mines's core values of respect, diversity, compassion, and collaboration will be honored in this course, and the standards in this class are the same as those expected in any professional work environment. (More information can be found here.) Discrimination or harassment of any type will not be tolerated. As a participant in this course, we expect you to respect your instructor and your classmates. As your instructor, it is my responsibility to foster a learning environment that supports diversity of thoughts, perspectives and experiences, and honors your identities. To help accomplish this:

- Course rosters are provided to the instructor with the student's legal name. I will honor your request to address you by a preferred name or gender pronoun. Please advise me of this preference early in the semester so that I may make appropriate changes to my records.
- If something is said or done in this course (by anyone, including myself) that made you or others feel uncomfortable, or if your performance in the course is being impacted by your experiences outside of the course, please report it to:
  - Me (if you are comfortable doing so)
  - The Office of Institutional Equity & Title IX
  - The Office of Institutional Equity & Title IX – Anonymous Option

In this course, we will cultivate a community that supports survivors, prevents interpersonal violence, and promotes a harassment free environment. Title IX and Colorado State law protects individuals from discrimination based on sex and gender in educational programs and activities. Mines takes this obligation seriously and is committed to providing a campus community free from gender and sex-based discrimination. Discrimination, including sexual harassment, sexual violence, dating violence, domestic violence, and stalking, is prohibited and will not be tolerated within the Mines campus community. If these issues have affected you or someone you know, you can access the appropriate resources on the Mines Title IX website. You can also contact the Mines Title IX Coordinator, Carole Goddard, at 303.273.3260 or titleix@mines.edu for more information.

It's on us, all of the Mines community, to engineer a culture of respect.

Support Resources @ Mines:

If you feel overwhelmed, anxious, depressed, distressed, mentally or physically unhealthy, or concerned about your well-being overall, there are resources both on- and off-campus available to you. If you need assistance, please ask for help form a trusted faculty or staff member, fellow student, or any of the resources below. As a community of care, we can help one another get through difficult times. If you need help, reach out. If you are concerned for another student, offer assistance and/or ask for help on their behalf. Students seeking resources for themselves or others should visit the CARE at Mines website.

Additional suggestions for referrals for support, depending on comfort level and needs include:

- Student Outreach & Support (SOS): for various resources and options, or to submit an online "SOS referral" about someone you're concerned about (email sos@mines.edu)
- CASA: for academic advising, tutoring, academic support, and academic workshops
- Counseling Center: there are also online resources for students on the website or call 303-273-3377 for an appointment. Located in the Wellness Center 2nd floor at 1770 Elm St.

- Health Center: students may call 303-273-3381 for appointment. Located in Wellness Center 1st floor at 1770 Elm St.

- Colorado Crisis Services: for crisis support 24/7, either by phone, text, or in person. Colorado Crisis Services is a great confidential resource, available to anyone by calling 1-844-493-8255, or texting "TALK" to 38255. Walk-in location addresses are posted on the website.

  All of these options are available for free for students. The Counseling Center, Health Center, and Colorado Crisis Services are confidential resources. The Counseling Center will also make referrals to off-campus counselors, if preferred.

  In an emergency, you should call 911, and they will dispatch a Mines or Golden PD officer to assist.

Food or Housing Challenges:

Any student who faces challenges securing their food or housing and believes this may affect their performance in the course is urged to contact Student Outreach and Support for support. Furthermore, please notify your professor if you are comfortable in doing so. This will enable your professor to provide resources that may be available.

Policy on Academic Integrity/Misconduct:

The Colorado School of Mines affirms the principle that all individuals associated with the Mines academic community have a responsibility for establishing, maintaining and fostering an understanding and appreciation for academic integrity. In broad terms, this implies protecting the environment of mutual trust within which scholarly exchange occurs, supporting the ability of the faculty to fairly and effectively evaluate every student's academic achievements, and giving credence to the university's educational mission, its scholarly objectives and the substance of the degrees it awards. The protection of academic integrity requires there to be clear and consistent standards, as well as confrontation and sanctions when individuals violate those standards. The Colorado School of Mines desires an environment free of any and all forms of academic misconduct and expects students to act with integrity at all times.

Academic misconduct is the intentional act of fraud, in which an individual seeks to claim credit for the work and efforts of another without authorization, or uses unauthorized materials or fabricated information in any academic exercise. Student Academic Misconduct arises when a student violates the principle of academic integrity. Such behavior erodes mutual trust, distorts the fair evaluation of academic achievements, violates the ethical code of behavior upon which education and scholarship rest, and undermines the credibility of the university. Because of the serious institutional and individual ramifications, student misconduct arising from violations of academic integrity is not tolerated at Mines. If a student is found to have engaged in such misconduct sanctions such as change of a grade, loss of institutional privileges, or academic suspension or dismissal may be imposed. The complete policy can be found in the Mines Policy Library.