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Course Syllabus

GEL 4400 Applied Volcanology

(Applied Volcanology Field Experience + Lecture)

2025 FIELD VOLCANOLOGY DESTINATIONS

Volcanism of Colorado, New Mexico & Arizona

Note: The associated 2025 GEL4400 field portion is a combined field trip with GEL3530 - Field Geology

Summer 2025

sec. 001 - TBA: Hybrid Lecture & Field Course Rm: SI2012

COURSE(S) ADMINISTERED THROUGH THE **CANVAS** PLATFORM

Please log in through your MSU DENVER account!

Ancillary Course URL: https://www.geotours.earthscienceeducation.net/VOLC/index.htm

Professor
Uwe Richard Kackstaetter, Ph.D. (Dr. "K")
Office: SI 2017

Office Hours
Face-to-Face: TBA
Online: By appointment!

This syllabus may be modified at any time without prior notice.

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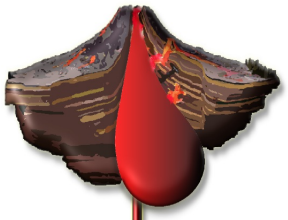


Overview

Volcanology is an exciting geoscience course which is rarely offered around the nation and in Colorado, mostly because of lack of knowledgeable instructors. If offered, it usually is a lecture course without any field visit or component. Volcanology field camps are commonly the purview of a few select universities, such as Hawaii, Alaska, Oregon and Washington with no problem filling the available seats.

However, the Department of Earth and Atmospheric Sciences at Metropolitan State University of Denver now offers the unique opportunity to participate in a 5 credit upper division hybrid field and lecture course called "Applied Volcanology". Here we will not only learn the core science principles behind volcanoes and their shaping of landscapes and societies, but will also visit active volcanoes. Fieldwork and on-site assessments are an integral part of this course.

This course is offered on a several year cycle either as an international Applied Volcanology course where we visit active volcanoes around the globe, or as a national Applied Volcanology course where our field studies take us throughout the United States.

Course Description

This hybrid field and lecture course GEL4400 explores volcanic activity both past and present in alternating locations around the earth. Depending on the year offered the field portion of the course may be national or international. Eruptive mechanisms, lithology, geomorphology, environmental and economic impacts as well as geologic hazards are discussed. An integral part of the course is hands-on field work applying theoretical knowledge to the active study of volcanic geology, associated petrology, and eruptive geohazard assessment by visiting active and inactive volcanoes and volcanic zones as well as adjacent geomorphic vicinities. A 10 to 15-day excursion is an integral part of the course and will be required. Additional field trip fees apply.

Prerequisits:

GEL1010 or GEL1020 or equivalent or permission of instructor
Recommended: GEL3050 or equivalent, GEL4050 or equivalent, basic algebra concepts as well as some trig

Outline of Course Content

The course is designed to integrate on-site lectures with field experiences:

1. Extrusive igneous rocks
   - a. Felsic, Intermediate, Mafic
   - b. Identification - Field ID
   - c. Geochemistry
     - i. Sampling, Analysis, Assessment
     - ii. Magma modeling from geochemistry
2. Volcanoes and plate tectonics
3. Volcano classification by geomorphology
4. Field Observation and Mapping
5. Eruptive types and mechanisms
   - a. Eruptive models
     - i. Modeling volcanoes using the "Erupt" software
     - ii. "Bubble" science
   - b. VEI (Volcanic Explosion Index) Estimation, Calculation
   - c. Magma chamber evolution
6. Volcanic Gases
   - a. Common gases and their measurements
   - b. Field Gas Measurement
   - c. Role in eruptions
   - d. Contribution to the atmosphere
7. Environmental Impact
   - a. Geomorphology
   - b. Predictability
   - c. Consequences in populated areas
   - d. Field assessment
   - e. Mitigation

Specific (Measurable) Student Behavioral Learning Objectives

Upon completion of the course the student should be able to:

1. Differentiate between various extrusive igneous rocks
2. Compose a chronology of volcanic events from lithologic field evidence
3. Calculate the VEI of a volcano from map and debris data
4. Model volcanic eruptions using appropriate settings in the Erupt software
5. Distinguish between various volcanic eruptive types and volcanic geomorphology
6. Compare volcanic gas exhalation and their contribution to the atmosphere
7. Infer future volcanic activity from past data and current understanding of eruptive mechanisms
8. Analyze volcanic impact on society as observed from field evidence.

Required Course Materials:

1. COMPUTER REQUIRED, PC preferred since many specialized software packets do NOT run on MAC!
2. Kackstaetter, U.R., 2019, 1st ed., Manual of Rapid Mineral Identification - Vol I, ISBN 978-0-9820580-2-2
3. Open Access / FREE Texts (*there is no single text that covers everything required for a course like this*):
   a. Brantley, S.R. (2018) "Volcanoes of the United States: A Project Gutenberg EBook." https://www.gutenberg.org/files/57530/57530-h/57530-h.htm
   b. Aiello, G., (Ed.). (2018). Volcanoes - Geological and Geophysical Setting, Theoretical Aspects and Numerical Modeling, Applications to Industry and Their Impact on the Human Health. IntechOpen. https://doi.org/10.5772/intechopen.68230
   c. Stoppa, F., (Ed.). (2012). Updates in Volcanology - A Comprehensive Approach to Volcanological Problems. IntechOpen. https://doi.org/10.5772/925
   d. Nemeth, K., (Ed.). (2016). Updates in Volcanology - From Volcano Modelling to Volcano Geology. IntechOpen. https://doi.org/10.5772/61961
   e. Németh, K., (Ed.). (2021). Updates in Volcanology - Transdisciplinary Nature of Volcano Science. IntechOpen. https://doi.org/10.5772/intechopen.87815
   f. Paone, A., & Yun, S., (Eds.). (2020). Forecasting Volcanic Eruptions. IntechOpen. https://doi.org/10.5772/intechopen.77483
4. FREE Software:
   a. Zotero (https://www.zotero.org/) Citation Manager! Integrates with MSWord!
   b. GCD kit (http://www.gcdkit.org/) Geochemical Data processor
   c. Brucker S1PXRF Software - ZIP file, PC only. XRF software for data collected with Handheld XRF.
5. Field Notebook, Rockhammer, Camera

Ancillary Materials:

6. USGS Volcano Program Website - Includes news, publications and interactive volcanological hazards map server.https://www.usgs.gov/programs/VHP
7. Other FREE Software:
   a. https://college.earthscienceeducation.net/IMP/Software/Magma_Install.exe Most likely Abandonware, PC only. No longer supported. Magma is a simple utility that calculates silicate magma/lava classifications and properties from user-entered major-element compositions. Software instructions.
   b. https://www.geotours.earthscienceeducation.net/VOLC/Software/Erupt3_Install.exe Most likely Abandonware, PC only. No longer supported but powerful eruption simulator. Simulates various eruption types and geomorphic landscape creations.

Grading in GEL4400

	Max. Points
Comprehensive Participation Quizzes & Labs - Individual	100
GROUP Field Guide & Expert Paper: According to Field Lecture Topic(s)	200
GROUP Field Lecture Day with Activity	200
Field Exercises Execution - Individual	100
Field Notebook - Individual	200
GROUP CIPW norm & classification	100
Volcanology ASBOG Exam - Individual	100
TOTAL	**1000**

Final Grade Distribution Scale by Points

A+ > 990	**A = 900-990**	**A- = 895-899**
B+ = 870-894	**B= 800-869**	**B- = 795-799**
C+ = 770-794	**C = 700-769**	**C- = 695-699**
D+ = 670-694	**D = 600-669**	**D- = 500-599**
	F = ≤ 500 points	

Checking Your Course Grade

All exercises and grades are processed through CANVAS. Please log in to see your grade updates as they become available.

COURSE COMMUNICATION:

The official course communication is CANVAS and your **msudenver.edu** email. Make sure you know how to access both. Do NOT ignore any course messages coming through these two official channels. Your grade may depend on it!

ELECTRONIC DEVICES:

This course requires access to a computer, the internet and a printer. If you do not own personal electronics, our computer labs at MSU Denver can accommodate but you may then need to plan additional time for the course utilizing these resources.

You will also need a cell phone or tablet or laptop that you MUST bring to every class session. In the rare event that you do not own a cell phone, you must then purchase a physical remote iClicker to earn your participation points.

READY YOUR TECHNOLOGY:

As stated above, technology is REQUIRED for this class. Successful students make technology work for them. Please ready your technology for success at MSU Denver during your FIRST week in the course. These tasks involve getting your phone student-ready as well as your main school device, which is your tablet or computer you'd use to work on your courses. Students without a main device or in need of a printer can work in computer labs like Tivoli 225, Science 1058, Plaza 307, West 244, or Admin 260. Here is a checklist for your convenience.

- ☐ Know your single-sign-on username and password and password is a secure one
- ☐ Multifactor Authentification is set up (Authenticator app is on phone)
- ☐ Successfully log into campus WiFi, AurariaNet when on campus
- ☐ Canvas Student App on phone and main school device, logged in successfully, notifications turned on
- ☐ Optional: Canvas Calendar synced to phone and device calendars
- ☐ Outlook App on phone and main school device, logged in, Email appearing properly
- ☐ Teams App on phone and main school device, log in successful
- ☐ Word App on main school device
- ☐ PowerPoint App on main school device
- ☐ Student Hub added to phone homescreen
- ☐ Auraria police and text a tip added to phone contacts, Rave alert phone and email verified
- ☐ Note-taking method determined and supplies purchased
- ☐ Student ID card acquired for building access
- ☐ Optional: RTD app or ParkMobile app downloaded
- ☐ Create a folder on your phone for School Apps
- ☐ iClicker App purchased and installed w/ course login verified

USING AI (ARTIFICIAL INTELLIGENCE):

AI (Artificial Intelligence, such as ChatGPT, etc.) opens a world of opportunities in the geosciences and can alleviate time constraints and stress. Therefore **you are allowed to use AI** for labs, projects or other assignments, with the following addendum:

1. **Remember GIGO** (garbage in - garbage out) from the early days of computing. AI is not infallible! I have tried it and it DOES make mistakes or is missing the point. AI can and does "invent" data. Experts call this "AI hallucinations" and it is real. Therefore, don't trust AI blindly to do a good job. You must still carefully proof-read and edit your work. You are ultimately responsible for correct content, so be careful!!!!
2. **Cite any AI work**: If you use AI, the segments produced by it in your work must be cited, same as you would when including another author´s work. You will NOT lose points if AI is used extensively in your work as long as it is properly cited. Beware, that you can lose significant points if you try to hide that fact.
3. When using examples of your course work in portfolios **for future employment or graduate school, AI work may NOT be accepted**. Do NOT try to hide it. AI is used in academia and employment offices to spot work generated by AI with a high degree of accuracy. AI generated resumes, for example, especially electronic ones, can be auto-rejected by AI HR software of your anticipated employer / graduate school admissions. For these reasons it might be best NOT to use AI for every work project. Be selective where and when to use AI.
4. AI and Exams: **Obviously, I do NOT allow AI as a source for taking open book online exams!** As for now, I use the honor system, but reserve the right for occasional spot checks. If abuse is detected, you are in danger of being charged with academic misconduct, which is a serious "can of worms" you do NOT want to open. Think in terms of "felony" rather than a "misdemeanor".

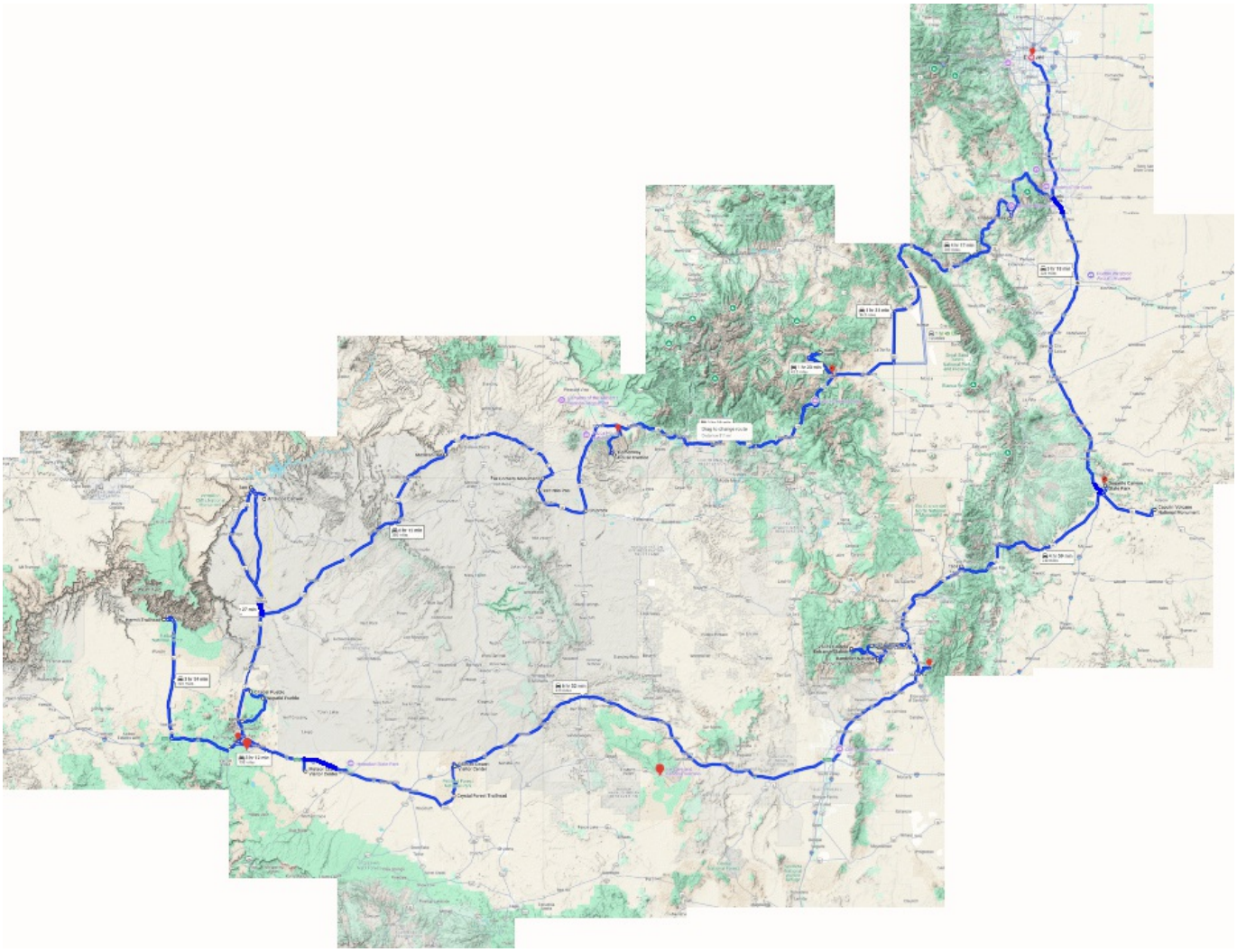
MANDATORY FIELD TRIP:

NOTE

2025 SHARED FIELD TRIP - **Two** Classes (GEL3530 & GEL4400), **ONE shared field trip**!

Save BIG, enroll in both, PAY ONLY ONE TRIP FEE

The heart of the course is a 10 day field trip exploring volcanology in CO, AZ and NM. This excursion is mandatory for passing the course and additional trip and travel fees next to tuition apply. Details will be discussed in class.



IN-FIELD ASSESSMENTS (during Field Trip)

Group Field Lecture Day (200pts): Students are responsible to lecture in the field according to their chosen expert topic. The students in charge are also responsible for planning and executing a field research activity for that day. Grading is based on lecture quality (100 pts ea.) and the activity (100 pts). More or less lecture stops will be prorated accordingly.

Individual Detailed Field Notebook (200pts): Students are required to keep an individual detailed field notebook /journal during the trip recording observations, measurements, calculations and lecture details. Grading of this notebook will be in line with GEL2530 - Introduction to Geologic Field Work. Completed notebook / journal is to be scanned and uploaded to CANVAS after the trip for grading.

Group Field Guide Expert Topic Paper (200pts): Literally a trip guide for geologists to be assigned and prepared BEFORE the fieldtrip. A copy will be handed to ALL field participants. A geologic research activity that involves all participants must also be part of the paper. Please see additional handout for details. All reportsare to be uploaded to CANVAS by the indicated deadlines.

Lab Exercises (100pts): A selection of hand on exercises will be given during the lecture block which are to be completed in the field. Lab exercises are to be turned into CANVAS after the trip for grading.

IN-CLASS ASSESSMENTS (during course lecture portion)

Group Geochemical Analysis & CIPW Norm Calculations (100pts): Students will collect selected volcanic samples and process them geochemically for analysis and rock classification. This is time intensive lab work that will be completed AFTER the trip. The results are to be summarized and interpreted, the volcanic rock classified, and turned into CANVAS for grading.

Comprehensive Volcanology Final Asbog Type Exam (100pts): A Final Exam will be administered in this class during our assigned Finals time and is only available during this time slot. This exam covers EVERYTHING from this course, including readings, labs and lectures. There is NO study guide provided by the instructor. However, the absolute best study guide you will have are your diligent notes taken during the course including the lecture(s), the lab(s), the book(s), and the lab manual / exercises. The exam is CLOSED resources (NO books, notes, labs. internet, etc. allowed) and has 2-hour time limit. All questions are multiple choice. It can be taken only ONCE and NO retakes are possible.

Required iClicker Electronic Device App for Face-to-Face classes

The F2F course requires you to download and install the iClicker Student Web App in order to participate in iClicker classroom activities on your laptop, tablet, or smartphone and receive your participation grade points for the course. While creating an iClicker student account and installing the app is free, being able to use it to earn participation credits for the course is NOT. Upon creating an account, students have a 14-day free trial period to use the iClicker student app to participate in class. Before that 14-day free trial period ends, students must purchase a subscription or access code in order to continue using the iClicker student app to join class sessions to participate in class. Cost for a 6-month access subscription is a nominal ~$16 as of this writing.

The subscription can be purchased through our MSU Denver bookstore or directly online from iClicker. Details can be found here. Please note that this is REQUIRED and **your grade depends on it**.

When you come to class, immediately login to your iClicker account for the course. Please use the MSU Denver secure password protected network. Do NOT use MSU Denver's Guest login, as this has a tendency to cause problems as you participate in the course.

GROUP PROJECT "FREELOADER" STATEMENT

Every student working in a group should pull his or her own weight. "Freeloaders" who just put their name in a group hoping to get a good grade while others do the work will be dropped from the group and receive a ZERO by consensus of the remaining group members.

How are "Freeloaders" identified? Here are some common examples that will qualify you as a "Freeloader" and put you in danger of a ZERO:

- Hard to contact; Not replying to emails or phone calls from the group. Group members should document when they initiate contacts with other group members.
- Not initiating contacts themselves, but leaving it up to the group to contact them and then playing the "nobody contacted me" game when the assignment is due. Similarly, engaging in so called "last minute contacting

frenzies", such as NO contact initiation all semester long, but then frantically sending out multiple contacts just before the deadline, claiming that this somehow qualifies as really having "tried" to contact the group.
- Not following through with assigned or selected tasks. This is especially cumbersome when done last minute close to the deadline. To help mitigate this behavior, groups should set internal deadlines and keep all group members accountable for completion of tasks.
- Turning in very shoddy or plagiarized work, the so called "last minute internet copiers". Cutting it close to deadlines, turning in something blatantly copied from the internet as "their" contribution. Not only does this behavior constitute academic fraud, group members should report such behavior immediately to the instructor.

YOU HAVE BEEN WARNED!

Note: Do not wait too long for a group member to "come through. Document any sign of "Freeloading" by a group member and contact the instructor early. Waiting too long neither serves you nor the "Freeloader" and jeopardizes everyone's grade.

"I have been kicked out of my group. Now what?"

You have two options: (1) Find another group that will let you work with them. (2) Do the work yourself! Working in a group is NOT required and you are allowed to do the work alone, by yourself. In either case, you will still be responsible for meeting ALL the associated group project deadlines!

PARTICIPATION:

Participation is evaluated through module quizzes. Each module quiz covers materials from the lecture(s), the lab(s), the book(s), and the lab manual / exercises as applicable. These quizzes are completely OPEN resources (notes, books, manuals, internet, video, etc.) I only ask that you take the quizzes BY YOUR LONELY SELF without the help of any other people. These quizzes have NO time limit and can be completed ANY TIME before the published deadline. Each quiz can be taken TWICE up to the published deadline. The two scores will be averaged.
Important Note: Taking the quiz AFTER the deadline will result in LATE PENALTIES, even for retakes!

ABSENCES:

Absences are irrelevant since this class may have also recorded lectures and the "participation / attendance quizzes" from theses lectures, book(s) and labs are administered online to be taken at your convenience. However, you are responsible for meeting all the deadlines as indicated.

LATE WORK:

General Late Work Penalty is -10% / day processed automatically through the CANVAS grading system with the lowest possible grade of 1% for late work! Zeros are only give if NOTHING is turned in / taken!
YOU DO NOT HAVE TO WAIT FOR THE DEADLINE TO TURN IN YOUR ASSIGNMENTS!!! I will accept work any day, any time up to the deadline. Turn things in early and you will not run into trouble with uncooperative electronics or sudden work / family conflicts. *Hint: Turn your work in early and there will be NO problems!*

EXTRA CREDIT:

If you do an excellent, top-notch job, some extra credit (up to 10%) is build into assignments, labs, quizzes, and exams at the discretion of the instructor.

LAB TIME:

This course requires a lot of lab time after the trip if you want to be successful. There will NEVER be enough time to complete ALL labs during the scheduled course time. You will need to complete the labs in many instances outside the course time on your own. You will have lab access. Use it wisely!

LABORATORY KITS (optional):

In this course you might want to use your Lab Kits from GEL1010 and the ADVANCED LABORATORY KIT from GEL3050. If you have never had the lab safety lecture and exam, please visit with our departmental lab coordinator, Dr. Josh McGrath. (See CANVAS for details and to access the video lectures). **In addition, by enrolling in GEL4400 you are automatically accepting the following liability waiver:**

Lab Liability Waiver

1. All students participating in lab activities taught by the Department of Earth and Atmospheric Sciences should be aware that there is always an element of risk involved when working with equipment, machinery and/or chemicals. These risks involve serious injury or death, especially if safety protocols are not followed and/or equipment, machinery, and chemicals are misused. Instructors and/or Lab Personnel will use all reasonable precautions and students need to exercise prudent behavior during such activities, but even then there exists the possibility of an accident or injury. Since many of these activities are to be undertaken in the field and outside of the classroom without the direct supervision of an instructor, students must be alert and aware of possible risks and dangers when using chemicals, equipment, and/ or machinery with or without supervision.

2. Neither the University, nor the instructor, nor any assigned Lab Personnel shall be liable for any damages, including but not limited to injuries, death, loss of property or profits, or incidental, consequential, exemplary, special or other damages that may result from use of chemical, equipment, and/or machinery used in conjunction with or outside the framework of this college course. This condition also expands to the use of procedures and formulations given in LAB texts.

3. The associated LAB instructions and described analytical procedures are intended for use by mature persons following the safety instructions precisely. Neither the author, nor the instructor, nor the University does accept liability or responsibility for any injury or damage to persons or property incurred by performing the experiments described in the LAB texts, nor for the content of any outside material referred to in class or manual, including linked websites.

4. EXPLICIT SAFETY RULES & REGULATIONS:
   a. You MUST wear Safety Goggles when working with chemicals or using equipment or machinery.
   b. You MUST read and follow instructions precisely.
   c. Do NOT misappropriate chemicals, equipment or machinery other than its intended and prescribed use.
   d. You must take care not to ingest, inhale, taste or otherwise orally contact chemicals or reactive products. NO FOOD / DRINK IN LAB AREA! You MUST wash hands after each experiment.
   e. Some tests may include open flames. You MUST take precautions in hair and clothing to avoid accidental or intentional contact of persons and property with flames and fire.
   f. You MUST take care when transporting equipment to avoid spillage and unintended contact with property and persons.
   g. Students who violate any of the above rules, policies and stipulations which are written in this document or implied through instruction and professional laboratory behavior or who fail to conform to directives from the instructor or lab personnel may be immediately dismissed from the course. They may also be subject to a failing grade, be required to withdraw from the course, and be subject to disciplinary action by the University.
   h. All participants MUST SIGN the following LIABILITY WAIVER.

In consideration of my being permitted to participate in this activity, I, by enrolling in GEL3050 hereby release and hold harmless: the Trustees of the Metropolitan State Universities of Denver, the Earth and Atmospheric Sciences Department, and respective employees, from all claims, losses, damages, or expenses because of property damage or personal or bodily injury incurred or caused by me during or in conjunction with the above mentioned activity or activities. By enrolling in GEL3050, I acknowledge that I fully understand the risk that is inherent with on and off campus laboratory procedures and/or equipment and/or machinery use. I also indicate by enrolling in the course that I will follow appropriate safety rules and regulations. Furthermore, I have fully read and understand the department policies and my liability and do accept the restrictions.

EAS Social Media Information

Our departmental social media is a great way to get updates on national and international field trip opportunities; find interesting events, outings, and new courses; connect with alumni, professionals, and other students; and network for career, internships, scholarships and travel opportunities.

Facebook: https://www.facebook.com/MSUDenverEAS

Instagram: https://www.instagram.com/eas_msudenver/

LinkedIn: https://www.linkedin.com/company/msu-denver-department-of-earth-and-atmospheric-sciences

LinkedIn is the best way to connect with faculty, alumni, and current students for career opportunities

General Knowledge Prerequisites!

It is assumed that you have acquired the following general knowledge skills in the sciences, language, and math through your current education and similar venues. It is the students FULL responsibility to make-up ANY deficiencies in these areas, preferably before enrolling in the course. I will NOT teach, lecture, or tutor any student in these basic High School skills and general knowledge subjects and no further instruction on the topics listed below will be given.

Basic Office Software

Know how to properly use and command MS Word, MS Powerpoint, MS Excel. Graphing with Excel, putting figures / pictures into Word documents, compiling a short presentation using PowerPoint are expected skills in my course.

English Language

Students should be able to write in short, clear, concise sentences when answering questions. Proper syntax becoming to a college student is expected. In many instances you will also be graded on professionalism which includes expressing yourself accordingly in writing. Unless otherwise instructed, always use third person when writing for the sciences. Usage of "I", "we", "my", "mine", "our", is uncommon in technical writing and needs to be avoided.

Basic Mathematical Operations

Students should be able to do the following mathematical operations without any further instructions:

- Round answer to significant digits. *(If you have problems with this, watch the video)*
- Doing unit conversions (e.g.; continental drift happens at about 5.5cm/yr. How fast would this be in mph?)
- Percent calculations (e.g.; you measure 2.58g/cm^3. The actual density is 2.65g/cm^3. What is your percent error?)
- Using **units** in ALL your operations (*I am real stickler about that!*)
- Solving equations for an unknown value; manipulating equations (basic Algebra)
- Basic Geometry: surface areas, volumes, circumferences, areas, angles
- Scientific notations (e.g.; 1.8×10^{-9}m/s) & scientific prefixes (milli-, mega-, terra-, micro-, etc.)
- Metric system & conversions within (µg, mg, g, kg, t, µm, mm, cm, m, km, m^2, km^2, cm^3, m^3, km^3)
- Weights & Measurements (Both American and Metric)
- Operating a scientific calculator (e.g.; know how to switch between degrees and radians, know how to use the arctangent function) $\theta°$=arctan(rise/run) *Warning: NO cell phone calculators are allowed!*

Graphing

You are required to be able to differentiate between bar, line and scatter graphs and know how and when each one needs to be constructed. Students should be able to hand-draw curved graphs without being sloppy. Be able to extrapolate values from any graph given, no matter the scale and type.

Physics

Students should be familiar with basic Newtonian laws of motion and understand terms such as velocity, acceleration, inertia, mass vs. weight, force, gravitational constants, kinetic energy, potential energy. Being able to work with the following basic physics equations is a must (Middle School Physics!):

$v=d/t$ $a=d/t^2$ $a=(v_f-v_i)/t$ $F=ma$ $I=mv$ $KE=½mv^2$ $PE=ma_g\Delta h$ $a_g=9.8m/s^2$ or $30ft/s^2$

Chemistry

Background in basic High School chemistry is essential. Students should know element names and associated symbols, how to read atomic weight and atomic mass from the periodic table, difference between covalent, ionic, metallic and hydrogen bonding, meaning of chemical formulas and subscripts. Students also need to understand pH and the difference between oxidizing and reducing environments. Furthermore, a working knowledge of solutions, solubility, mixtures, homogenous and heterogenous systems, and precipitation is a must.

Geography

Students should know basic physical geography, which includes the location of countries, major mountain ranges, and major rivers.

Drawing & Drafting

While the world is moving rapidly to electronic PC drafting, sketching results by hand is a essential skill in geology. Students must be able to use a drawing compass and a protractor. Sketching curves through data points is another required skill.

Citations

Students should know how to properly fomat and include citations in their work. I highly recommend the FREE citation tracker and database ZOTERO. It will automatically incorporate into your search engine and MSWord, can grab sources from the web at the click of a button and will make citing and creating correctly formatted references a breeze.

COLLEGE OF LETTERS, ARTS, AND SCIENCES SYLLABUS STATEMENTS

A syllabus is a binding contractual document for any course and becomes the guiding legal document when enrolling in a course. Many policies, procedures and resources are university, college and / or department wide and thus are automatically an integral part of THIS SYLLABUS.

To read these additional policies, procedures and resources, log in to your course in CANVAS and look at the always up-to-date material listed under the

University Policies and Resources Module

for further information.

In case of disagreements between the student and the university faculty and staff, students are responsible for full knowledge of the provisions and regulations pertaining to all aspects of their attendance at MSU Denver, and should familiarize themselves with the policies found in the
University Policies and Resources Course Module

FYI:

For this course you are part of the
COLLEGE OF LETTERS, ARTS, AND SCIENCES (CLAS)
and the
DEPARTMENT OF EARTH & ATMOSPHERIC SCIENCES (EAS)