Map Interpretation

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Class (remote) 1:40-2:40 pm MWF 2:00-3:50 pm Th (LAB)

Office Hours email to schedule appointment

Required Texts

 Map Interpretation of Topographic Landforms Using Google Earth

 Wilkerson (PDF DRAFT-Moodle)

 An Introduction to Geological Structures & Maps

 Bennison, Olver, & Moseley, (2011, 8th ed, Hodder Education)

Recommended Texts

Surface Processes & Landforms Easterbrook, (1999, 2nd ed, Prentice Hall) <u>Geotours Workbook</u> (should already have from GEOS 110) Wilkerson et al., (2017, 2nd ed, W.W. Norton, Inc.)

Materials

Pencil (0.5mm, 2H or 2), pen, eraser, scientific calculator (no phones), ruler, protractor, & USB flash drive (colored pencils -> useful).

COURSE GOALS

To use observations, measurements, and the logic of science to analyze and **interpret** topographic and geologic maps in the context of the geologic processes that formed/sculpted them. Upon completion of this course, you should leave with a better understanding of...

- how to read and understand fundamental map elements (e.g., scale, coordinate systems, etc.).
- the relationship of map patterns to tectonic, geomorphic, hydrogeologic and climatic processes that shape and influence landform development.
- the interpretation of surface topography in the context of the underlying subsurface geology (e.g., rock types, geologic structures, etc.).
- the construction, analysis, and interpretation of geologic map patterns in areas of complex topography (using structure-contour maps).
- how to create geologic cross sections that are constrained by the geologic map patterns.
- valuable (aka marketable) quantitative skills/techniques and technologies (e.g., Google Earth, Inkscape/Adobe Illustrator, etc.) essential for obtaining a deeper understanding of geoscience-related map data.

Maps and cross sections provide a critical means for visualizing and understanding all kinds of location-based data that we encounter in our day-to-day lives. As such, **understanding how to accurately construct, interpret, and analyze maps and cross sections is a key practical skill for all geoscientists/environmental scientists in the 21st century**. That is, maps and cross sections help us address many applied problems that face today's society, ranging from identification and extraction of mineral & hydrocarbon resources to recognizing pollution sources and tracking both contamination plumes and remediation efforts to understanding natural hazards in order to predict future occurrences.

This syllabus is meant to provide an outline for the general flow of the course. At my discretion, I will add or omit topics and/or modify the timetable.





DESCRIPTION

This course employs a variety of teaching approaches to maximize student learning of geoscience content in a classroom where different students optimally learn material in different ways. Specifically, this course will involve a combination of Apple Keynote & DVD (e.g., movie clips, animations, interactive problem-solving, etc.) computer-based lectures supplemented with hands-on, applied projects/labs/homework sets using Inkscape/Adobe Illustrator/Affinity Designer, Google Earth, TouchTerrain, USGS DEM files, etc. Because of this hands-on approach, the distinction between "lecture" and "lab" may become blurred throughout the semester (in terms of both content and class times).

Most assignments will involve problems from the Wilkerson (Wilk; 1st half of the semester) and Bennison, Olver, & Moseley (BOM; 2nd half of the semester) texts. The Easterbook text (recommended) provides a general reference to help answer homework questions. Assignments may/may not be turned in for a grade, but the material will be addressed on the exams (i.e., exams will primarily focus on hands-on, active-learning problems involving maps, much like the homework exercises/ assignments).

GRADES

The basis for final grades is described in the table below. *Make-up* exams/quizzes will not be given unless there is a documented emergency or unless we have arranged a make-up in advance because of exceptional circumstances.

All materials to be turned in for a grade must be turned in on time, be clearly written (or typed), use the prescribed file naming convention, and

be in order (in sequence, pages not backwards or rotated, etc.). Work that fails to meet these criteria will not be accepted and will receive a "0". Quizzes may be announced/unannounced and may cover material from assigned readings, "lecture", and/or "lab" (*I may have you turn in some labs/assignments for a quiz grade to show that you worked the problems, but not for an explicit check of your answer(s)*).

Participation. Participation/engagement grades for this course will be based on a "standard" - "sub-standard" system. Everyone starts out with a "standard" grade, and I expect that most of you will finish the semester with this grade. A "standard" grade means you are attending class consistently, and you are participating in a reasonable way during most class sessions. If I judge your participation to be falling into the "sub-standard" range (e.g., excessive absences/tardiness, consistent lack of preparation or participation in activities, electronic distraction, sleeping/lack of attention, frequently getting up in class, etc.), I will explain the issue to you without penalty and will work with you to develop a plan for improvement. If an issue persists, I will explain the issue again and will assign a sub-standard participation grade. Each such sub-standard grade will result in lowering your final course grade by one percentage point.

Percent of Final Grade		Grading Scale*			
Exams 1-4* (you may drop your lowest exam score, so each exam will ultimately be 25% x 3= 75%) Landform Storymap w/ 3-D DEM Model Assignments/Quizzes * if time does not permit 4 exams, then we no exam will	75% 15% 10% be dropped	88% 77% 66% 55% 00%	100.0% 87.9% 76.9% 65.9% 54.9%	= A- to A = B- to B+ = C- to C+ = D- to D+ = F	(90%-100.0%) (80%-89.9%) (70%-79.9%) (60%-69.9%) (00%-59.9%)

I provide my slides as PDFs on Moodle, so that students can print them out before class and annotate them with detailed notes during class (as I commonly provide more information than is provided on the projected lecture slides). That way, students aren't scrambling to write down every single word on a slide, allowing them to focus on the content and to participate in the discussion. To facilitate discussion (and because the book and I may choose to focus on different aspects of a given topic), students must "R&R" the textbook and the lecture slides before class (no, this is not "rest & relaxation", but rather "read & retain"). Please ask questions about any material (lecture or textbook) that you need clarified.



KEYS TO SUCCESS IN THIS COURSE

- 1. Read the Assigned Chapter in a distraction-free environment and in advance of lecture over that material. As you're reading, carefully note any questions that you have.
- 2. Take Good Notes. Students with complete notes seem to do better in class. If possible, <u>print out the lecture slides before class and annotate them from the lecture/discussion</u> (including sketches from the whiteboard). Rewriting your notes will make them more legible and orderly, plus it will help you focus on areas that are still unclear. Be careful of falling into "TV-watching mode", as it is easy to look at the pictures and not take down any notes.
- 3. Ask Questions. The only "bad" question is one that is unasked. Because you will be responsible for material in each assigned chapter whether that material is specifically covered during lecture or not, it is essential to ask questions to clarify any concepts that you do not understand. PLEASE do not be too shy, embarrassed, intimidated, afraid, etc. to ask questions.
- 4. Know the Key Terms for each topic (use available glossaries, online resources, etc. to help you). If I use a term that you don't understand, PLEASE ASK me to define it.
- 5. Check out the Internet. There is a world of information on maps out on the Web (you might use a search engine to find web sites of interest).
- 6. Use the library. There are many books & articles in the library that pertain to maps (see http://libguides.depauw.edu/geosciences; we have a great interlibrary loan system for other materials that our library does not carry). Also, you will find introductory geology & geomorphology textbooks in the library, which will provide helpful information about geologic features and processes.
- 7. Create your own Study Aids. Some people like to highlight text in the chapter, others like to make flash cards, and still others like to study in groups and discuss the material. Feel free to experiment with what works for you. In addition, the Academic Resource Center in Asbury Hall (1st floor) has Q tutors and trained people available to help you refine and improve your study habits and techniques.
- 8. Study the Material on a Regular Basis. It is important that everyone maintain good study habits by regularly working with the assigned material (especially the assignments). Procrastination and cramming just don't work for most of us...it is best to get comfortable with the material as we go along so that you don't fall behind.
- 9. Study for the Exam as an Individual and then as a Group. Again, different people study in different ways. I've found that it helps to study as an individual first (thinking about what important concepts were emphasized in each chapter & lecture), then get together with others and study as a group (e.g., asking each other questions, brainstorming about what will be on the test, etc.).

FAQ:

Are lecture notes from the slides provided? PDF's of the lecture notes will be available in Moodle. Please bring printouts to class, so that you can annotate them (I commonly go more in-depth than what is on the slides, so you will be responsible for knowing that detail on the exams). Please note that if I post notes from the last time the course was offered, I will post any revised PDF's of the lecture notes before the next corresponding exam.

Can we have an exam review sheet? I have found it much more effective to highlight topics as a preface for each slide set with a "Learning Objectives" slide, so that you are aware of important topics prior to me going over them. While not comprehensive, these Learning Objectives slides are a good first-order framework for assimilating the material.

When will get feedback on our graded work? I usually need at minimum of a week to return graded work (although I'm often much quicker). While I might not always write detailed explanations on graded work, I will orally go over the answers or work the problems in class (usually based on student requests). Please ask questions if a concept is not clear or if you have a question on how I graded your work. Additionally, you need to give me feedback about how the course is going. It is important that you "rein me in" if I go too fast or if I haven't explained something to where you understand it. Ask questions!!!

Are there other useful books or online resources?

Any geomorphology, physical geology (e.g., Marshak), or geologic map interpretation textbook.

Easterbrook, 1999, 2nd ed., Surface Processes & Landforms, Prentice Hall, 546 p. (1st edition on reserve in Prevo)

Wyckoff, J., 1999, Reading the Earth, Adastra West, 352 p.

https://www.usna.edu/Users/oceano/pguth/website/microdem/microdem.htm

http://elasticterrain.xyz

http://www.gpsvisualizer.com

https://www.google.com/earth/desktop/

- https://basemap.nationalmap.gov/arcgis/rest/services/USGSTopo/MapServer/
- http://touchterrain.geol.iastate.edu

TENTATIVE ORDER OF TOPICS

Week Starting	Topics	Assignments			
	last day to withdraw - 4/02				
	last day for P-D-F adjustments - 4/09				
01: 02/01	Syllabus/Course Organization				
(no classes Mon 02/01)	Introduction to Google Earth	Moodle (Google Earth_Getting Started)			
	Review of Basic Map Elements	Wilk (Review of Basic Map Elements)			
	Introduction to Topographic Maps	Wilk (Introduction to Topographic Maps)			
Part I-Topographic Maps					
02: 02/08	Stream Landforms	Wilk (Stream Landforms)			
03: 02/15	Stream Landforms	Wilk (Stream Landforms)			
04: 02/22	Karst Landforms	Wilk (Karst Landforms)			
(Day of Dialogue 02/24)					
05: 03/01	Glacial Landforms	Wilk (Glacial Landforms)			
06: 03/08	Exam #1-03/08 (est)	Wilk (Fold Landforms)			
	Fold Landforms				
07: 03/15	Fracture & Fault Landforms	Wilk (Fracture & Fault Landforms)			
(no classes Tues 03/16)					
Part II-Geologic Maps					
08: 03/22	Introduction to Inkscape	Landform Storymap due-3/22			
		Wilk (Inkscape for Geoscientists)			
09: 03/29	Exam #2-03/29 (est)	BOM (Ch 1-3)			
	Horizontal and Dipping Strata				
10: 04/0E	2 Dt Drobloms	POM (Ch 4)			
10. 04/05 (no classes Wed 04/07)	5-Pt Ploblellis	BOW (CIT4)			
11: 04/12	Geo-Unconformities	BOM (Ch 5)			
12: 04/19	Folded Strata	BOM (Ch 6-7)			
13: 04/26	Evam #3-04/26 (est)	BOM (Ch 8-9)			
(no classes Thur 04/29)	Faulted/Jointed Strata				
14: 05/03	Complex Folds & Faults	BOM (Ch 10)			
2 00,00					
15: 05/10	Complex Folds & Faults				
(last day of class 05/13)					
Exam #4: Mon, May 17 @ 8:30-11:30 am					
Note: These topics and exam times are subject to change.					

Policy Page

ADA STATEMENT

It is the policy and practice of DePauw University to provide reasonable accommodations for students with properly documented disabilities. Written notification from Student Accessibility Services is required. If you are eligible to receive an accommodation and would like to request it for this course, please contact Student Accessibility Services. Allow one week advance notice to ensure enough time for reasonable accommodations to be made. Otherwise, it is not guaranteed that the accommodation can be provided on a timely basis. Accommodations are not retroactive. Students who have questions about Student Accessibility Services or who have, or think they may have, a disability (psychiatric, attentional, learning, vision, hearing, physical, medical, etc.) are invited to contact Student Accessibility Services for a confidential discussion. Student Accessibility Services can be reached by phone at 765-658-6267 or studentaccessibility@depauw.edu. Meetings with SAS staff will be conducted virtually this semester.

ATTENDANCE

Regular and on-time attendance is expected and monitored (see the Student Handbook https://www.depauw.edu/ handbooks/academic/). As stated in the Student Handbook, excessive absences can be grounds for being dismissed from the course. In addition, it has been my experience that learning comprehension improves dramatically when students are present to listen to lectures, to ask questions, and to discuss the material in the classroom setting. In addition, some activities (e.g., field work) require attendance to receive credit. Should you know that you will be absent (e.g., health issue regarding yourself or immediate family, athletic obligation, etc), please contact me in advance (or ASAP afterwards) to make arrangements about assignments.

ACADEMIC INTEGRITY

Any attempt to gain an unfair advantage over other students in the class will be handled in accordance with established University procedures as described in the Academic Handbook section

http://www.depauw.edu/handbooks/academic/ on Academic Integrity.

DePauw Academic Resources on Academic Integrity

http://www.depauw.edu/academics/academic-resources/ academic-integrity/

Writing Center Information on Plagiarism:

http://www.depauw.edu/academics/academic-resources/ academic-resource-center/w-center/w-center-handouts/

CELL PHONE/COMPUTER/SMART DEVICE USE

Before class begins, turn off your cell phone (or set it to vibrate) and put it away. Do not check or send voicemail or text messages during class, and do not leave class to check or send messages unless 1) you have an emergency (inform your instructor prior to class starting of special circumstances involving a personal emergency situation that would require you to use your phone when class is in session) or 2) are on an instructor-designated break. In other words, do not use your cell phone in class for any reason at any time unless you have consulted with the course instructor.

If you have a cell phone/smartwatch on your person or on your desk/table during an exam without the instructor's permission, you will receive a 0 on the exam, and you will automatically be considered in violation of DePauw's academic integrity policy on cheating due to unauthorized use of a cell phone/ smartwatch. You may not take your cell phone/smartwatch with you on bathroom breaks during exams.

Please read the following: <u>http://www.insidehighered.com/</u> blogs/just-visiting/open-letter-incoming-freshmen

Laptops, tablets, smartwatches, and other electronic devices are not allowed to be used in the classroom except for activities directly related to our course as specified by your instructor (e.g., do not check or send emails, chats, or texts, do not use your web browser except for course-sanctioned activities, etc.). Quit all programs not specifically designated by your instructor (not only reducing temptation, but also helping your computer run more efficiently).

Violating the cell phone/computer/smart device use policy is one way students may be considered not engaged/participating in course activities (see the Grades discussion on participation above).

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CLASSROOM BEHAVIOR

- Early is on time, and on time is late. (especially on days with activities).
- Respect everyone. (yourself, your peers, and your instructor).
- Listen and contribute. Lecture and discussion portions of our class can quickly morph to lecture only if you are not an active and contributing participant in class.
- Work to the best of your ability. True learning is hard work and is constructed and nurtured by you (not simply transferred from the instructor). A strong work ethic will not only serve you well in this course, but in life in general. Do not settle for less than your best effort.
- Be aware of consequences (positive & negative). If you make good decisions (e.g., reading the course materials, taking notes, asking questions, working hard, etc.), you will likely experience good consequences such as enhanced understanding of geoscience processes, improved grades, and general success in life. Conversely, poor decisions (e.g., waiting to cram right before an exam or assignment, pulling an "all-nighter" and coming to class exhausted, relying on energy drinks or other substances, distracting yourself or others with cell phones or laptops, etc.) typically have negative consequences that cause your understanding of course content to suffer.
- Consider the classroom your workplace. Once you step inside the classroom, commit yourself to learning as much as you can during that time. Do not routinely get up during class to take care of personal needs (e.g., bathroom breaks, social networking, etc.). Please address these needs during the break between classes. If an emergency occurs, please feel free to leave the classroom to address it.

AUDIO/VISUAL POLICY

- No video, audio, or still picture recordings are allowed during class without the instructor's permission.
- No video recordings, still picture, or other means of duplication (e.g., xeroxing) of homework assignments, labs, exams, etc. are allowed without the instructor's permission.
- ADA accommodations pertaining to recordings of lectures for taking notes are addressed by the instructor providing handouts of lecture slides/ materials.