GEOL 310: Sedimentology and Stratigraphy

MWF 8:00-9:00, Julian 223 (lecture) • Tuesday 8:30-11:20, Julian 223 (lab)

Instructor: Dr. Tim Cope
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Office Hours: Use my calendar (link here and on Moodle) to make an appointment

Course Materials

Required Text: *Sedimentary Geology from Source to Sink,* by Tim Cope. Chapters will be made available to you in pdf format on Perusall. Any additional required readings will also be made available to you. The book is not complete yet, but I will be working on it as the semester progresses. I am eager to hear feedback!

Optional text: *Principles of Sedimentology and Stratigraphy*, by Sam Boggs. This has been the "standard" textbook for sedimentology and stratigraphy for many years, and it has fairly good coverage of the topics covered in the latter part of the class. Appropriate chapters to read for each week are listed on the schedule.

Lab Materials: Hand lens, grain-size scale (provided), brain. There will be a $10 lab fee deducted from your student accounts to cover the cost of lab materials.

Course Goals

This is an upper-level geology course focused on the interpretation of sedimentary rock. By the end of this class, you should be able to:

- describe the processes by which sediment is created, transported, and deposited;
- describe and identify common types of sediment and sedimentary rocks;
- interpret sedimentary deposits in terms of depositional processes;
- recognize the deposits of common sedimentary environments;
- interpret and correlate stratigraphic successions; and
- apply your skills and knowledge to a real outcrop.

Course Outline

This course is a survey of modern sedimentary geology that will give you experience interpreting sedimentary rocks in terms of the processes that created them. Completing the course should give you a greater understanding of what sediment and sedimentary rocks can tell you about Earth surface processes and how those processes have changed through time. The skills and knowledge you learn in this class have applications in core facets of environmental and geological work.

Reading and lecture:

The topics we'll be covering are listed on the schedule at the end of this syllabus. Each topic comes with assigned reading from what I hope is an excellent new textbook (in progress...). Most of the topics will be taught during one-hour lecture sessions. The lectures and book are not redundant: the book contains all the details, and the lecture will present the "big picture". Please keep up with the reading and take good notes on *both* the reading and lecture! I expect students to come to class already having read the chapter for that week, and to ask questions if clarification is needed. Readings will be posted on Perusall.

I will be mainly using PowerPoint slides with a mixture of figures from the book and the primary scientific literature to teach this class. Because some of the illustrations I will use were not created primarily for this class,

I will highlight what is important about each. You must be active in class, not passive: it is your responsibility to capture these important points in your notes, because you may not be able to easily retrieve them from the PowerPoint later. If you miss a class, be sure to complete the reading and get notes from another student.

Laboratory/Homework:

The laboratory exercises listed on the attached schedule are meant to give you experience interpreting sedimentary rocks at various scales and applying the concepts we discuss in lecture. Many of them will keep you occupied well beyond the normal lab period. I will also assign homework problems as needed. If you have questions or need help, please email me or make an appointment using my online calendar.

Labs and homework assignments are not tests. They are practice to help you learn. Please treat them that way. Because I consider your lab work to be practice, lab assignments will not be rigorously graded. However, failure to complete labs and homework in a timely manner will result in a significant drop in your grade. If you fail to hand in more than two assignments, you will fail the course. It is your responsibility to make sure that you understand how to do everything in the lab assignments correctly, because you will be tested on it!

Field trips:

The best place to learn about sedimentary rocks is in the field. So, we're having a lot of field trips. Most of them will take place during the lab period. On these days, we'll leave early (7:00) and return to campus late (12:20), so pack a lunch. We will also have a full-day field trip during the weekend of April 6-7. Put these dates in your calendar now—I'm hoping to schedule the all-day trip on a single day that the entire class can attend.

Term Paper:

This course in part fulfills the "Writing in the Discipline" (WD) component of DePauw's writing curriculum. Two of our field trips will be to classic exposures of the Mansfield Formation in Indiana. Each student will interpret the observations they make during these field trips to place the Mansfield Formation into broader geologic context in an illustrated, well-referenced term paper that is due on Friday, April 19. You should start seeking out references for this now—both GeoRef and Google Scholar are good places to start.

Exams:

There are two midterms and a final exam. Collectively, these are worth 70% of your grade. Exams will cover material from lecture, from the reading, and from lab. The final exam will be comprehensive (but focused mainly on material not covered in prior exams).

Grading:

Grades will be assigned as follows.

One-hour exams (2):	40%
Final Exam (Cumulative):	30%
Lab Exercises/ homework:	10%
Perusall reading/participation:	10%
Research Paper:	10%

Grading scale:

A 93-100%	C 76-74%
A- 92-90%	C- 73-70%
B+ 89-87%	D+69-67%
B 86-84%	D 66-64%
B- 83-80%	D- 63-60%
C+ 79-77%	F <60%

COURSE POLICIES

Electronic devices

Please bring your laptop to every class session, but do not allow it to become a distraction. While in class, please use your laptop only for coursework. Cell phone use is prohibited unless specifically requested by me. Do not

use any electronic devices for frivolous purposes during class (SnapChat, TikTok, text messaging, etc.). You should adhere to these rules for all of your classes, not just mine!

Academic dishonesty

Cheating, plagiarism, or any other submission of the work of others as your own violates DePauw's policy on academic integrity. It also defeats the purpose of your education. If you are ever confused about what does or does not constitute academic dishonesty, just ask yourself whether your motivation is to help you better attain the learning outcomes for this class. If not, chances are you are in violation of the policy.

Violations of the academic integrity policy may result in penalties ranging from a lowered grade to course failure, suspension, or expulsion. The policy can be found in the Student Handbook. If you have any questions about my expectations regarding academic integrity, including expectations regarding group work, it is your responsibility to ask me.

Generative AI Policy

Any use of AI in this class will be treated just like assistance from another person. Assistance of any kind is prohibited on items meant to assess *individual* learning, such as exams and quizzes. Likewise, it circumvents the learning goals of this class—and it is plagiarism—to turn in written work generated by AI in place of your own.

However, it is wholly appropriate for writers to incorporate ideas or information from outside sources into their writing, as long as the source is clearly identified. It is also appropriate to brainstorm, discuss, or get feedback on your written work from others, as long as the help is acknowledged. These *collaborative* uses, within limits, are appropriate uses of AI in this course.

Just like other sources, any substantial ideas or information obtained from AI should be vetted by you for accuracy (AI often misunderstands or is wrong). It must also be cited, following MLA guidelines. I may require you to produce a transcript of any conversations you have with AI for written work in this class, so be sure to save these.

Diversity & Inclusivity:

It is the policy and practice of this course to create a welcoming environment for all students and to address students in accordance with their personal identity. In this course, you will be encouraged to remain open to information, ideas, and experiences shared by other students.

Accommodations for those with disabilities

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 in Union Building Suite 208 or by phone at 658-6267.

COURSE SCHEDULE

Week	Lecture topic	Reading	Lab Assignment	Other
Jan 29	Sedimentary geology in context	Ch. 1	-------	**NO LAB**
Feb 5	Sediment sources: weathering, erosion	Ch. 2	Modern Sediment Transport Systems	**Lab field trip:** Feb. 6 (9:30 AM)
Feb 12	Sediment sinks: sedimentary basins	Ch. 3	Textural analysis of sediment	
Feb 19	Fluids	Ch. 4	Detrital Rocks	
Feb 26	Sediment transport	Ch. 5	Chemical Rocks	
Mar 4	Sedimentary structures	Ch. 6	Provenance analysis	**Exam 1:** Monday, Mar 4
Mar 11	Detrital sediment and rock	Ch. 7	Sedimentary Structures	
Mar 18	Chemical sediment and rock	Ch. 8		
	Spring Break: March 22 - 31			
Apr 1	Facies	Ch. 9*	Depositional systems: the Mansfield Formation	**Lab field trip:** Apr. 2
Apr 8	Terrestrial environments	Ch. 10* (Boggs, Ch. 8)		**Solar Eclipse:** Apr. 8 **Lab field trip:** Apr. 9
Apr 15	Marginal marine environments	Ch. 11* (Boggs, Ch. 9)	Stratigraphic successions	**Lab field trip:** Apr. 16 **Research Paper due:** Apr. 19
Apr 22	Marine environments	Ch. 12* (Boggs, 10 & 11)	Lithostratigraphic correlation	**Exam 2:** Monday, Apr. 22
April 29	Lithostratigraphy	Ch. 13* (Boggs, Ch. 12)	Magnetostratigraphic & biostratigraphic correlation	
May 6	Stratigraphic correlation	Ch. 14, 15* (Boggs, 13, 14)	Sequence stratigraphic correlation	

Comprehensive Final Exam: Monday, May 13, 8:30 -11:30 am