

SYLLABUS FOR ERSC 309 - SEDIMENTOLOGY AND STRATIGRAPHY

professor: Marcus M. Key, Jr., Ph.D., P.G.
office: Kaufman 143
homepage: http://www2.dickinson.edu/departments/geol/Faculty/key_contact.html
e-mail: key@dickinson.edu (When replying to an e-mail message from me, always include original message in reply. This way I know the context of your reply.)
mailbox: box in Earth Sciences Department office in Kaufman 103
phone: 717-245-1448
office hours: I have an open door policy; grab me after class or e-mail me to set up an appointment
library liaison: Nick Lonergan 245-1838, lonergan@dickinson.edu
course guide: <http://lis.dickinson.edu/Library/Research/SubjectGuides/EarthSciences/geol209.htm>
lecture room: Kaufman 152
lecture hours: T, Th 9:00-10:15 A.M.
lab room: Kaufman 152
lab hours: T 1:30-4:30 P.M.
optional text: Principles of Sedimentology and Stratigraphy, 5th edition by S. Boggs, Jr. 2012, Pearson Education; ISBN-13: 978-0-321-64318-6; You will not be tested on anything in the book that is not covered in lecture or lab. The book simply provides alternative text and graphics to the content in the lecture.
prerequisites: ERSC 141 and 142, or permission of instructor
required gear: As stated on the dept web page (<http://www2.dickinson.edu/departments/geol/majorequip.html>), all earth sciences majors are required to purchase a rock hammer, a hand lens, a pair of safety glasses or goggles, two field notebooks, and an acid bottle. I will provide the required field gear to non-majors who choose not to purchase them.

There will also be one required weekend field trip.

Lecture PowerPoint slides and lab manuals are available on Moodle.

This course fulfills 1/2 of the college's Writing Requirement. The other half is fulfilled by Earth Materials (ERSC 305).

Learning Objectives:

- Primary (content):

- to understand the physical, chemical, and biological processes that generate, transport, and deposit sediment
- to understand the products of these processes (i.e., sediments and sedimentary rocks) and be able to describe them in the field and lab
- to understand how these processes and products vary across scales (i.e., from grains to beds to facies to basins to planets)
- to understand how these processes and products vary through time and three dimensional space (i.e., stratigraphy)
- to be able to infer process from observed product to predict where those processes and/or products have occurred in the past in the subsurface and/or will occur in the future at the surface

- to be able to draw connections between sedimentary geology and other sub-disciplines of the Earth Sciences, other scientific disciplines in general (esp. Archaeology), and everyday life in human society
- to be able to use fundamental principles and concepts of sedimentary geology to solve problems using sedimentary and stratigraphic data
- As this is a SCON course (i.e., Sustainability CONnections course): to learn about living sustainably on a planet with finite sedimentary resources (i.e., sand, gravel, concrete, cement, gold, uranium, coal, oil, natural gas, groundwater); What is the stratigraphic record of human's unsustainable use of these resources (i.e., global warming/ocean acidification)?

- Secondary (skills):

- to develop your observational (develop a new set of eyes), field, analytical, quantitative reasoning, critical thinking, computer, problem solving (i.e., quantitative literacy) skills
- to learn how to find information in the primary literature, critically evaluate it (i.e., information literacy skills), assimilate it, synthesize it, and communicate it orally and in writing
- to learn how to work collaboratively in teams (mainly in lab and field)
- to develop a life-long interest in learning more about the natural world
- to be able to make an informed decision if you want to pursue some aspect of sedimentary geology in graduate school

Grading:	- Lecture:	midterm*	10 %
		final*	10 %
		attendance	5 %
		current events**	5 %
		extra credit for attending 3 ERSC seminars****	3 %
	- Lab:	information literacy lab***	5 %
		terrigenous grain properties lab***	5 %
		Girty's Notch field trip lab***	5 %
		porosity, permeability, viscosity lab***	5 %
		rock classification quiz*	5 %
		stratigraphic facies analysis lab***	5 %
		field final*	5 %
	- Project:	project proposal***	5 %
		first draft of paper***	10 %
		peer evaluation***	5 %
		oral presentation***	5 %
		final draft of paper***	10 %

*No make ups given

**Your current events grade is based on the number of current sedimentology/stratigraphy-related articles (web, newspaper, magazine, etc.) you present to the class. There is a limit of five articles over the course of the semester, so if you bring in five you get 100%, 4 = 80%, etc.

*** late papers will be penalized 5% per business day late

**** To expose you to aspects of the Earth Sciences other than Sedimentology and Stratigraphy you can earn up to 3% extra credit by attending up to three departmental seminars which are

usually at noon on Tuesdays in the Social Hall. Those not on Tuesdays at noon are listed below. To get credit, you must sign in with me at the seminar.

Dickinson College makes reasonable academic accommodations for students with documented disabilities. I am available to discuss the implementation of those accommodations. Students requesting accommodations must first register with Disability Services to verify their eligibility. After documentation review, Marni Jones, Director of Learning Skills and Disability Services, will provide eligible students with accommodation letters for their professors. Students must obtain a new letter every semester and meet with each relevant professor prior to any accommodations being implemented. These meetings should occur during the first three weeks of the semester (except for unusual circumstances), and at least one week before any testing accommodations. Disability Services is located in Biddle House. Address inquiries to Stephanie Anderberg at 717-245-1734 or email disabilityservices@dickinson.edu. For more information, see the Disability Services website: www.dickinson.edu/disabilityservices.

You are responsible for knowing the College's Official Policy on cheating and plagiarism. I am required in my contract to enforce the College's zero tolerance policy. If you cheat or plagiarize you are suspended for one semester and receive an F for the course. Collaborative work in lecture and lab is encouraged as collaboration is commonplace in the academic and nonacademic scientific worlds. It involves discussion and sharing of ideas about the interpretation of data. Though ideas may be formulated in collaboration with your colleagues, all work turned in (i.e., labs, tests, and papers) must be independently produced.

Bring lecture notes/slides and previous lab manuals to each lab.

The following numbered reading assignments for lecture, lab, and field trip refer to chapters in Boggs (2012) and the lab manual for each week posted on Moodle. PowerPoint slides, book chapters, and lab manuals should be read before you come to the lecture, lab, or field trip. They are for preparing you for the lecture, lab, or field trip. We will cover some material in greater depth than the textbook, and vice versa. You are responsible only for the material covered in class. ***In addition to your reading, your weekly homework*** involves working on your individual research project for the course. I don't give you lots of busy work so you have time to work on your individual projects.

The following schedule is tentative and subject to change. I would rather cover less material well than more material poorly, so if we fall behind, adjust your reading accordingly. Exam, lab, and assignment dates shouldn't change.

<u>DATE</u>	<u>TOPIC</u>	<u>READING ASSIGNMENT</u>
<u>WEEK 1</u>		
8/27-29	Lec: Introduction, Project Assignment	none
8/27	Lab: Field trip - Yellow Breeches Creek; wear water shoes, shorts	lab manual
<u>WEEK 2</u>		
9/3-5	Lec: Origin of sedimentary grains	1
9/3	Lab: Information literacy skills lab with library liaison in the Information Commons Classroom in basement of library	lab manual
<u>WEEK 3</u>		

9/10-12	Lec: Grain parameters	3
9/10	Lab: Terrigenous grain properties	lab manual
9/12	Paper: 2 nd draft of written proposal due in lecture	
<u>WEEK 4</u>		
9/17-19	Lec: Porosity and Permeability	3
9/17	Lab: Field trip - aggregate quarry	none
<u>WEEK 5</u>		
9/24-26	Lec: Sedimentary processes	2
9/24	Lab: Field trip - Girty's Notch	lab manual
9/27-29	Required weekend field trip to Cape Henlopen	
<u>WEEK 6</u>		
10/1-3	Lec: Sedimentary processes	2
10/1	Lab: Field Trip data analysis	
10/3	Paper: 1 st draft of paper due in lecture	
<u>WEEK 7</u>		
10/8-10	Lec: Sedimentary processes	2
10/8	Lab: Porosity, Permeability, Viscosity	lab manual
<u>WEEK 8</u>		
10/15	Lec: Sedimentary rocks and structures	4-7
10/15	Paper: Peer evaluation of colleague's 1 st draft due in lecture	
10/15	Lab: Classification of sedimentary rocks	lab manual
10/17	Lec: Midterm	
<u>WEEK 9</u>		
10/22	Lec: None – Midterm Pause	
10/22	Lab: None – Midterm Pause	
10/24	Lec: Sedimentary basins & tectonics	16
<u>WEEK 10</u>		
10/29-31	Lec: Stratigraphy of global climate change	12,15
10/29	Lab: Quiz & Sedimentary structures	lab manual
<u>WEEK 11</u>		
11/5-7	Lec: Biostratigraphy	14
11/5	Lab: Field Trip to Colonel Denning State Park stream dynamics & Martinsburg Sh	
<u>WEEK 12</u>		
11/12-14	Lec: Magnetostratigraphy	13
11/12	Lab: Field trip – college quarry to measure section	lab manual
<u>WEEK 13</u>		
11/19-21	Lec: Seismic Stratigraphy	13
11/19	Lab: Stratigraphic facies analysis	lab manual

<u>DATE</u>	<u>TOPIC</u>	<u>READING ASSIGNMENT</u>
<u>WEEK 14</u>		
11/26	Lec: Sequence Stratigraphy	13
11/26	Lab: Paper Oral Presentations	none
11/28	Lec: None – Thanksgiving break	
<u>WEEK 15</u>		
12/3	Lec: Catch up and review for finals	none
12/3	Lab: Field Trip – lab final	8, 9, 16
12/5	Lec: Course evaluation, review for final, final draft of paper due	none

Monday 12/9 LECTURE FINAL EXAM 2:00-5:00 P.M. in Kaufman 152