

**Course Description and Syllabus**  
**Principles of Stratigraphy (GEOL 44070/54070)**  
**Kent State University Department of Geology**  
**Spring 2009**

**Instructor:** Dr. Joseph D. Ortiz  
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Lecture: TR, 12:30pm-1:45pm  
Lab: W, 11:00am-12:40pm

McGilvrey Hall Room 234  
McGilvrey Hall Room 116

**Office Hours:** T: 10:00-11:00 am, W: 2:15-4:00 pm; R 10:00-11:00 am, or by appointment.

**Course Rationale and Objectives:** The record of Earth's history is writ large in its sedimentary strata. Unraveling the contents of this great book requires specific geological skills and a considerable amount of detective work! Students in this upper level course will be introduced to the systematics of sedimentary rocks and the processes by which they form, erode, and are transformed by early diagenesis. Emphasis will be placed on understanding the underlying principles of sedimentation and their controls on various temporal and spatial scales. A variety of environments will be studied so that the results of these processes can be recognized in the field. In addition to classical approaches, special note will be made of new techniques used in high resolution sedimentological research, particularly non-invasive sediment logging methods (e.g. Diffuse Spectral Reflectance) and geochemical stratigraphy (e.g.  $\delta^{18}\text{O}$  of biogenic calcite). These techniques are employed by the instructor as part of his active research. Lectures will be integrated with weekly labs and at least two required field trips.

**Topics to be covered:**

- Sediments and Sedimentary Rocks – genesis, types, distribution, and alteration
- Siliciclastic versus biogenic sedimentation
- Clastic transport and fluid flow
- Lithostratigraphy and facies relationships
- Sedimentary environments: Terrestrial, coastal, marine
- Geochronology and Chronostratigraphy
- High Resolution stratigraphic methods (e.g. core and well logging, chemostratigraphy)
- Sequence Stratigraphy

**Text and additional reading:**

- *Principles of Sedimentology and Stratigraphy*, (Fourth Edition), by Sam Boggs, Jr., Prentice Hall, 2005, ISBN-13 978-0131547285.
- Handouts and selected readings as assigned during the term.

**Prerequisites:** Petrology (GEOL 31070), and Invertebrate Paleontology (GEOL 34061), or permission of the instructor. Completion of Geomorphology (GEO32066) before enrolling in Stratigraphy is highly encouraged. Students are also expected to be familiar with Excel spreadsheet functions and quantitative manipulation of data through cell formulas. Training in the use of Excel is available through the Geology tutoring lab (see above), the KSU library 60 minute seminar series, and the Infosource online tutorial system (<http://infosource.kent.edu>).

**Course web site:** <http://www.personal.kent.edu/~jortiz/Strat/>

Note that as with all internet resources, access to or availability of the web site cannot be guaranteed. Exams will not be rescheduled. Please use the resources available on the web site in advance of exams.

**Office Hours and Consultation with the Instructor:** I want you to do well in the class! I welcome questions from all students either in person, by email, or by phone. Whether you are doing well in the course, are on academic probation, or think that you may find the course challenging, attending office hours can help make the course a more enriching experience. Please use your university email account when you contact me. This is university policy and will ensure your privacy when sending electronic messages. Include your first and last name and your banner id number on any electronic correspondence. Please cc a copy of any important messages that you send to the instructor back to yourself so that you have a record.

**Grading Policy:** Principles of Stratigraphy is one of two upper division capstone courses required of geology majors at Kent State University. The second capstone course is Field Camp. Class assignments, and in particular Midterm #3, will require you to employ and integrate concepts from the class prerequisites (Petrology, and Invertebrate Paleontology) with the material covered in this class. Students are thus expected to attend all class sessions, keep up with the reading, consult the online resources provided by the instructor, and complete all of the exam and class assignments.

**Grades will be determined as follows:**

Three Midterms (each worth 15%)	45%
Average Grade on Lab Assignments	15%
Grade on Field Guide/Report	15%
Cumulative Final Exam	25%
Total	100%

Grading may be on a curved scale at the discretion of the instructor, but each student has the potential to succeed in this course. When grades are available, they will be posted to the University's secure server using WebCT Vista. To access WebCT Vista, login to the flashline portal (<http://flashline.kent.edu>), then click to "My Classes" and login to WebCT Vista to access your grades online. Assignments will also be passed back to help students prepare for the cumulative final.

**Exam Dates:** Please contact the instructor immediately if you have a conflict with the exam dates as listed in the class schedule attached to the syllabus or as listed on the website.

**Assignment due dates, group activities, and late policy:** Lab and Field Assignments are due at the beginning of the lab period following the one in which they were handed out unless otherwise specified. Lab assignments for reading and discussion days will be a one-page, typed, summary handed in at the beginning of the lab session, and active participation in the class discussion. Many lab assignments will be conducted in groups. Each group may turn in one copy of their group assignment with all of the group member names listed. All group members are expected to contribute equally to all components of the assignment. You are required to know all of the material assigned as part of the labs and readings. If there are any concerns regarding your lab group, please contact the TA or instructor as soon as possible. Late assignments will be docked 1/3 grade per day (i.e., A => A- => B+ => B...).

**Make up Exams:** Students who miss an exam must provide a written excuse in order to receive a make up assignment. Legitimate excuses include written documentation of the following: your own illness, a death in the family, military or official university athletic commitments. If you are involved in military or official university athletic activities, review the exam schedule at the beginning of the term and consult with the instructor prior to the exam if you have a conflict. If an illness, personal crisis, or family tragedy causes you to miss an exam, you must contact the instructor by phone or email no later than 48 hours after the scheduled start time of the exam. It is very important that you provide your full name, email address, and a telephone number where you can be reached in your phone or email message.

**Field Trips:** At least two weekend field trips are required for this course. We will gather observations and data that will be analyzed in the following week's lab, and which will form the basis for geologic field reports. We will discuss proper report organization and professional writing in lab. Please contact the instructor immediately if you have a conflict with the dates for the field trips as listed in the class schedule attached to the syllabus or as listed on the website. Please note that weather is often quite variable during spring term. We usually camp during the extended field trip but will stay in hotels if the weather does not cooperate. Please plan ahead in terms of your finances in the event that we need to change our plans on short notice.

## University Policies

1. Enrollment Status: Students are responsible for ensuring that they are properly enrolled in their classes. You are advised to review your official class schedule during the first two weeks of the semester and prior to the drop and withdrawal dates to ensure that you are properly enrolled in this class and section.
2. Academic Honor Code: All students in the course are expected to abide by the academic honor code, as specified in the University's "Digest of Rules and Regulations". The use of other's intellectual property without giving them appropriate credit is a serious academic offense. This includes misrepresenting the source, nature or other conditions of your academic work to get undeserved credit. It is the University's policy that cheating or plagiarism can result in receiving a failing grade for the work or course or other more serious disciplinary action. Repeat offenses can result in dismissal from the University.
3. Drop and Withdrawal: For Spring 2009, the last day to drop from the class without receiving a grade of "W" is February 1, 2009. The last day to withdraw from the class with a grade of "W" is April 5, 2009. For more information, see the Spring semester withdrawal page on the registrar's web site.
4. Students with Documented Accommodation needs: In accordance with University policy, if you have a documented disability and require accommodations to obtain equal access to this course, please contact the instructor at the beginning of the semester or when given an assignment for which an accommodation is required. Students with disabilities must verify their eligibility through the Office of Student Accessibility Services (SAS) on the Ground Floor of the DeWeese Center (330-672-3391). If you have any questions regarding a potential accommodation need, please contact the instructor as soon as possible.
5. Final Exam Dates: Please check the final exam schedule for the classes in which you are enrolled. This can be found on the web at: <http://www.registrars.kent.edu/home/SPRING/exams.htm>

In the event that you have a conflict with another scheduled exam, the instructor will make suitable arrangements. Students who have conflicts or more than three examinations on the same day should consult with the Dean of his or her college at the earliest possible time for assistance in making alternative arrangements.

## Principles of Stratigraphy, Class Schedule

Week	Date	Lecture Number and Title	Reading, Boggs 4 <sup>rd</sup> edition
1	Jan 20 Jan 21 Jan 22	1. T: Significance of Sedimentary Geology W Lab 1: Siliclastic sedimentary rock classification 2. R: Physical Properties of sediments, sedimentary rocks	Ch. 1 Handouts, TBA Ch. 3
2	Jan 27 Jan 28 Jan 29	3. T: Siliclastic Sedimentary Rocks W Lab 2: Reading and Discussion (Black Shales) 4. R: Sediment transport mechanisms	Ch. 5 Handouts, TBA Ch. 2
3	Feb 3 Feb 4 Feb 5	5. T: Sedimentary Structures W Lab 3: Sedimentary structures: Identification R: Depositional systems, Facies, and Walther's Law	Ch. 4 Handouts, TBA
4	Feb 10 Feb 11 Feb 12	6. T: Exam I (Ortiz at Montreal post cruise meeting) W Lab 4: Sedimentary structures: Generation 7. R: Fluvial and Lacustrine Systems	Ch. 8, intro, Handouts Handouts, TBA Ch. 8.2, 8.4
5	Feb 17 Feb 18 Feb 19	8. T: Eolian and Deltaic Systems W Lab 5: Turbidity Currents (Field Trip or Feb 25?) 9. R: Siliclastic Tidal and Beach Systems	Ch. 8.3, 9.1-9.2 Handouts, TBA Ch. 9.3-9.6
6	Feb 24 Feb 25 Feb 26	10. T: Siliclastic Marginal Marine Systems W Lab 6: Turbidity Currents (Field Trip or Feb 18?) 11. R: Pelagic (Deep water) Systems	Ch. 10.1-10.2 Handouts, TBA Ch. 10.3
7	Mar 3 Mar 4 Mar 5	12. T: Carbonate Sedimentary Rocks W: Lab 7- Carbonate Petrology 13. R: Shallow water carbonate systems	Ch. 6 Handouts, TBA Ch. 11.1-11.5
8	Mar 10 Mar 11 Mar 12	14. T: Evaporites and Evaporitic systems W: Lab 8: Reading and discussion- Derek Ager 15. R: Stratigraphic Principles and units	Ch. 7.1-7.2; 11.6  Ch. 12.1-12.3
9	Mar 17 Mar 18 Mar 19	16. T: Lithostratigraphy; Nature of the Stratigraphic Record W: Exam II (75 minute duration) 17. R: Classical Biostratigraphy	Ch. 12.4-12.6 Handouts, TBA Ch. 14
	Mar 21-29	<b><i>No classes, Spring Break</i></b>	
10	Mar 31 Apr 1 Apr 2	18. T: Quantitative Biostratigraphy W Lab 9: Reading and Disc. "Simplifying the Stratigraphy of Time" 19. R: Core and Wire-line Logging	Handouts, TBA Handouts, TBA  Handouts, TBA
11	Apr 7 Apr 8 Apr 9	20. T: Magnetostratigraphy and Chemostratigraphy W Lab 10: Facies Model Interpretation 21 R: Radiometric (Numerical) dating methods	Ch. 13.1, 13.4; 15 Handouts, TBA Ch. 18.1-18.5
12	Apr 14 Apr 15 Apr 16	22. T: Seismic Stratigraphy W: Exam III (75 minute duration) 23. R: Plate Tectonics and sedimentation	Ch. 13.2-13.3  Ch. 16.1-16.3
	Apr 17-19	<b><i>Overnight weekend field trip, Southern West Virginia</i></b>	
13	Apr 21 Apr 22 Apr 23	24. T: Basin Analysis W Lab 11: Group Research on Field Guide 25. R: Sea level change and sedimentation	Ch. 16.4-16.7 Handouts, TBA Handouts, TBA
14	Apr 28 Apr 29 Apr 30	26. T: Sequence Stratigraphy – theory W Lab 12: Presentation of W. Virginia Field Guide 27. R: Sequence Stratigraphy – application	Ch. 13.3 Handouts, TBA Handouts, TBA
15	May 5 May 6 May 7	28. T: Sedimentary Resources W: Lab 13: Reading and Discussion: Experimental Earthscape 29. R: The future of sedimentology and stratigraphy	Ch. 7 Handouts, TBA Handouts, TBA
		<b><i>End of class sessions</i></b>	
16	May 15	<b>Final Exam</b>  <b><i>12:45-3:00pm Friday, May 15<sup>th</sup></i></b>	