Sedimentology and Stratigraphy (GEOL 44070/54070) Course Description and Syllabus
Kent State University Department of Geology Spring 2014

Instructor:
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Course Number:
Undergrad: GEOL 44070 (Sections 1 & 2)
Graduate: GEOL 54070 (Sections 1 & 2)

Registrar's CRN Number:
Undergrad Section 1: 13549; Section 2: 13550
Graduate Section 1: 13557; Section 2: 13558

Lecture (Section 1 & 2 Combined)
McGilvrey 234 (Unless otherwise noted)
MW 9:15 – 10:30 am

Laboratory: McGilvrey 116 (Unless otherwise noted)
Section 1: T: 11:00 - 12:40 pm
Section 2: T: 2:15 - 3:55 pm

Material is subject to revision as needed; Please check the class website, dropbox or instructor for additional information.

Professor Ortiz' Office Hours: M: 1:30-2:15 pm; W: 10:00-12:00 am, R: 1:30-3:30 pm; F: 10:30-12:00; or by appointment.
TA Kevin Engle Office Hours: Wednesday 10-2 pm and Friday 10-12 pm.
TA Chenjian "Bruce" Fu Office Hours: Wednesday and Thursday 12:30 - 3:30 pm.

Course Rationale and Learning Outcomes: 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. $\delta^{18}O$ of biogenic calcite). The instructor, as part of his active research, employs these techniques. 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, (Fifth Edition),* by Sam Boggs, Jr., Prentice Hall, 2012, ISBN-13 978-0-321-64318-6.
  (Note: You may be able to find a third or fourth edition of the text, but there are considerable differences as described on the class website.)
- *Handouts and selected readings as assigned during the term.*

Prerequisites and Suggested Courses: Earth Materials II (GEOL 31070), and Invertebrate Paleontology (GEOL 34061), or permission of the instructor. Completion of Geomorphology (GEO32066) before enrolling in Sedimentology and Stratigraphy is highly encouraged. Students are also expected to be familiar with Excel spreadsheet functions and quantitative analysis of data using cell formulas. Training in the use of Excel is provided in Scientific Methods in Geology (GEOL 42035), through the Geology tutoring lab (see above) or the KSU library 60-minute seminar series. While this class provides excellent preparation for Geology Summer Field Camp (GEOL 4/5092), many students complete Field Camp prior to talking Sedimentology and Stratigraphy due to various scheduling constraints.

Online Course materials: Information about the class and resources related to the class can be obtained from the sites listed below.

Course web site: http://www.personal.kent.edu/~jortiz/strat/
Course KSU Dropbox Site: https://dropbox.kent.edu/login.cfm?id=2956

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: Sedimentology and Stratigraphy is required of Geology BS majors at Kent State University. Class assignments will require you to employ and integrate concepts from the class prerequisites (Earth Materials II and Invertebrate Paleontology) with the material covered in this class. Students are 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. 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 typed, critiques of the reading 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 should turn in one copy of their group assignment with each member's name 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. Unexcused 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 written documentation in order to receive a make up assignment. Legitimate excuses include 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 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 we 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: The following University policies apply to anyone enrolled in this course:

1. University Calendar: The official university calendar, which provides information on deadlines for university-related transactions can be found at: http://www.kent.edu/registrar/calendars/stu_spring.cfm

2. Enrollment Status: The official registration deadline for this course is 01/26/2014. Courses can have different scheduling deadlines depending on their mode of instruction. University policy requires all students to be officially registered in each class they are attending. Students who are not officially registered for a course by the published deadline should not be attending class and will not receive credit or a grade for that course. Each student must confirm enrollment by checking his/her class schedule (using Student Tools in FlashFast) prior to the deadline indicated. Registration errors must be corrected prior to the deadline. You can look up your course using the Kent State University Self Service Scheduling tool. Enter the information needed to find the course for which you are searching. The add/drop/withdrawal dates can be found from the link in the final column.

3. Academic Honor Code: All students in the course are expected to abide by the academic honor code, as specified in the University's Policy Register. The use of other's intellectual property without giving them appropriate credit is a serious academic offense. This includes copying answers, misrepresenting the source, nature or other conditions of your academic work to get undeserved credit. At a minimum, students caught cheating on an exam will receive a midterm grade of zero, which will count for 50% of their overall average midterm score, and the incident will be reported to the university. It is the University's policy that cheating or plagiarism can result in receiving a failing grade for the course or other more serious disciplinary action depending on the nature of the offense. Repeat offenses can result in dismissal from the University. For complete information see Chapter 3-01.8 of the University Policy Register.

4. Drop and Withdrawal: The last date to drop this class is 01/26/2014. The last day to withdraw from this class is 03/23/2014. No approval is required to withdraw from a course prior to the drop/withdrawal deadlines. Student who stop attending the course, but who do not drop or withdraw from it will receive a grade of "SF". Student who enroll in the class, then never attend and who do not drop or withdraw from it will receive a grade of "NF". Students should be aware that receiving a grade of "SF" and "NF" could result in a financial aid audit and a loss of financial aid. Dropping or withdrawing from a class may also affect a student's financial aid status or academic eligibility for athletics. If a student is unable to complete a class or all classes in during a semester because of extreme circumstances, which first occur after the deadline, he or she should consult their college or campus dean's office. Any course withdrawal processed after the withdrawal date will appear on the students' academic record with a grade of "W". If you have questions about the impact that a drop or withdrawal will have on your academic record or financial aid, you should consult a university academic advisor or the financial aid office. Courses can have different scheduling deadlines depending on their mode of instruction. For information on add/drop/withdrawal dates, you can look up your course using the Kent State University Self Service Scheduling tool. Enter the info needed to find the course for which you are searching. The add/drop/withdrawal dates can be found from the link in the final column. For more info see: http://www.registrars.kent.edu/home/SPRING/withdrawal.htm.

5. 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 you are 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.

6. 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.kent.edu/registrar/calendars/spring_finalsch.cfm. In the event that you have two exams scheduled at the same time, 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.

7. NOTICE OF MY COPYRIGHT AND INTELLECTUAL PROPERTY RIGHTS. Any intellectual property

displayed or distributed to students during this course (including but not limited to power points, notes, quizzes, examinations) by Dr. Joseph D. Ortiz remains the intellectual property of the Dr. Joseph D. Ortiz. This means that the student may not distribute, publish or provide such intellectual property to any other person or entity for any reason, commercial or otherwise, without the express written permission of the Dr. Joseph D. Ortiz.

Syllabus Addendum

Bridging the Conceptual Divide Between Theoretical and Applied Environmental Chemistry

The Geology Department at Kent State University was recently awarded a significant grant from the National Science Foundation to study how and in what ways different classroom approaches influence student learning. This course section has been selected as one of the classes to be studied for the Spring 2014 semester. Dr. David M. Dees from the Faculty Professional Development Center will be visiting our class to explain to you the research design of this project, how it may or may not influence your experiences in this class, and offer you a chance to participate in the study. If you have any questions on this study beforehand, please do not hesitate to contact Dr. David M. Dees at 330-337-4285 or ddees@kent.edu.

Spring 2014 Sedimentology and Stratigraphy Class Schedule

Week	Date	Lecture Number and Title	Reading
1	**Jan 13**	1. M: Significance of Sedimentary Geology	Ch. 1
	Jan 14	2. T: Sediment transport mechanisms	Ch. 2
	Jan 15	3. W: Physical Properties of sediments, sedimentary rocks	Ch. 3
2	**Jan 20**	M: ***Martin Luther King Jr. Day, No Classes***	
	Jan 21	T: **Lab 1, Siliciclastic sedimentary rock classification**	Handout, TBA
	Jan 22	4. W: Siliciclastic Sedimentary Rocks	Ch. 5
3	**Jan 27**	5. M: Sedimentary Structures	Ch. 4
	Jan 28	T: **Lab 2, Reading and Discussion (Black Shales); Sedimentary Structures: Identification**	Handouts, TBA
	Jan 29	6. W: Depositional systems, Facies, and Walther's Law	Ch. 8
4	**Feb 3**	7. M: Fluvial and Lacustrine Systems	Ch. 8.2, 8.4
	Feb 4	T: **Lab 3, Sedimentary structures: Flume and Turbidity Currents, Part 1**	Handouts, TBA
	Feb 5	W: Exam I	
5	**Feb 10**	8. M: Eolian and Deltaic Systems	Ch. 8.3, 9.1-9.2
	Feb 11	T: **Lab 3, Sedimentary structures: Flume and Turbidity Currents, Part 2**	Handouts, TBA
	Feb 12	9. W: Siliciclastic Tidal and Beach Systems	Ch. 9.3-9.6
6	**Feb 17**	10. M: Siliciclastic Marginal Marine Systems	Ch. 10.1-10.2
	Feb 18	T: **Lab 4, Facies Model Interpretation**	Handouts, TBA
	Feb 19	11. W: Pelagic (Deep water) Systems	Ch. 10.3
7	**Feb 24**	12. M: Carbonate Sedimentary Rocks	Ch. 6
	Feb 25	T: **Lab 5 Carbonate Petrology**	Handouts, TBA
	Feb 26	13. W: Shallow water carbonate systems	Ch. 11.1-11.5
8	**Mar 3**	14. M: Evaporites and evaporitic systems	Ch. 7.1-7.2; 11.6
	Mar 4	15. T: Stratigraphic Principles and units	Ch. 12.1-12.3
	Mar 5	W: Exam II	
9	**Mar 10**	16. M: Stable Isotopes, Ice Volume, and Oxygen Isotope Stratigraphy	Ch. 15.4; Apdx. B
	Mar 11	T: **Lab 6, Stable Isotope and Rayleigh Distillation**	Handouts, TBA
	Mar 12	17. W: Lithostratigraphy; Nature of the Stratigraphic Record	Ch. 12.4-12.6
10	**Mar 17**	18. M: Classical Biostratigraphy	Ch. 14

Spring 2014 Sedimentology and Stratigraphy Class Schedule

	Mar 18	T: **Lab 7, Biostratigraphy**	Handouts, TBA
	Mar 19	19. W: Quantitative Biostratigraphy	Handouts, TBA
	Mar 24-30	***No classes, Spring Break***	
11	**Mar 31**	20. M: Magnetostratigraphy	Ch. 13.1, 13.4; 15
	Apr 1	21. T: Geologic Time and Radiometric Dating	Ch. 15
	Apr 2	W: Exam III	
12	**Apr 7**	22. M: Core and Wireline Logging	Handouts, TBA
	Apr 8	T: **Lab 8, Group Research on Field Guide**	Handouts, TBA
	Apr 9	23. W: Seismic Stratigraphy	Ch. 13.2-13.3
13	**Apr 14**	24. M: Plate Tectonics and sedimentation	Ch. 16.1-16.3
	Apr 15	T: **Lab 8, Group Research on Field Guide**	Handouts, TBA
	Apr 16	25. W: Sea level change and sedimentation	Handouts, TBA
14	**Apr 21**	26. M: **Presentation of W. Virginia Field Guide, Part I**	Handouts, TBA
	Apr 22	T: **Lab 9, Reading and discussion- "More Gaps than Record" and "Marxist Stratigraphy and the Golden Spike"**	Handouts, TBA
	Apr 23	27. W: **Presentation of W. Virginia Field Guide, Part II**	Handouts, TBA
	Apr 25-27	***Overnight weekend field trip, Southern West Virginia***	
15	**Apr 28**	28. M: Sequence Stratigraphy – theory and application	Ch. 13.3;
	Apr 29	T: **Lab 10: Reading and discussion- "Are we now living in the Anthropocene?" and "Simplifying the Stratigraphy of Time"**	Handouts, TBA
	Apr 30	29. W: Basin Analysis	Ch. 16.4-16.7
		End of class sessions	
16	**May 8**	**Final Exam, McGilvrey Hall Room 234** ***10:15 – 12:30 p.m., May 8, 2014***	