

Sedimentology and Stratigraphy (GEOL 44070/54070) Course Description and Syllabus

Kent State University Department of Geology Spring 2017

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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: 14108; Section 2: 14109 Graduate Section 2: 14116; Section 2: 14118
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Lecture (Section 1 & 2 Combined) McGilvrey 234 (Unless otherwise noted) MW: 12:30 – 1:45 am	Laboratory: McGilvrey 116 (Unless otherwise noted) Section 1: T: 11:00 - 12:40 pm Section 2: T: 2:15 - 3:55 pm
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Material is subject to revision as needed; Please check the class website or instructor for additional information.

Professor Ortiz' Office Hours: MWR 10:30am-12:30pm; T 10:00-11:00am; R 2:00-3:00pm or by appointment.
TA Amber Huston Office Hours: R: 9am-12pm; F: 11am-1pm, Room MCG 235A

SGE Room Geology tutoring (Starting 3rd week of the term): TWR 11:00 am - 2:00 pm, Room 223 MCG, No appointment necessary.

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. $\delta^{18}\text{O}$ of biogenic calcite). The instructor, as part of his active research, employs these techniques. Lectures will be integrated with regularly scheduled labs and a required field trip.

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 taking Sedimentology and Stratigraphy due to various scheduling constraints.

Online Course materials: Information about the class and resources related to the class can be obtained through Blackboard Learn site. Note that as with all internet resources, access to or availability of the web site cannot be

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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 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 on any electronic correspondence. Please cc a copy of any important messages that you send to the instructor or TA's 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 and in class 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. All students are expected to actively participate in discussions. Many lab assignments will be conducted in groups. Each group should turn in one copy of their group assignment with each group member's full 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 Trip: There is one required weekend field trip for this course. A major portion of your grade (15%) will be the group Field Trip Guide that you will research and write before the field trip. Although you will work on the field Guild during lab, it will be graded separately from the labs. 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 trip as listed in the class schedule attached to the syllabus or on the website. Please note that weather is often quite variable during spring term. We usually camp during the extended field trip, but for health and safety reasons, we will stay in a hotel 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.

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University Policies: The following University policies apply to anyone enrolled in this course:

1. Enrollment Status: The official registration deadline for this course is **01/22/2016**. 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 withdrawal dates can be found from the link in the final column.

2. 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 toward their class average and the incident will be reported to the university for further potential action. 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 Ch. 3-01.8 of the University Policy Register.

3. Withdrawal: The last date to drop this class before a grade of W is assigned is **01/22/2017**. The last day to withdraw from this class or any class with a grade of W assigned is **01/29/2017**. No approval is required to withdraw from a course prior to the withdrawal deadline. 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 withdrawal 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.kent.edu/registrar/spring-important-dates>

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 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; <http://www.kent.edu/sas>) located on the 1st floor of the University Library (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.kent.edu/registrar/spring-final-exam-schedule>. 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.

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6. 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.

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Week	Date	Lecture Number and Title	Reading
1	Jan 17	T: Lecture & Lab 1, Siliciclastic sedimentary rock classification 1. Siliciclastic Sedimentary Rocks	Handout, TBA Ch. 5
	Jan 18	2. W: Weathering and Significance of Sedimentary Geology	Ch. 1
2	Jan 23	3. M: Sediment transport mechanisms	Ch. 2
	Jan 24	T: Lab 2, Sedimentary Structures: Identification	Handouts, TBA
3	Jan 25	4. W: Physical Properties of sediments, sedimentary rocks	Ch. 3
	Jan 30	5. M: Sedimentary Structures	Ch. 4
	Jan 31	T: Lab 3, Sedimentary structures: Turbidity Currents, Part 1	Handouts, TBA
4	Feb 1	6. W: Depositional systems, Facies, and Walther's Law	Ch. 8
	Feb 6	7. M: Fluvial and Lacustrine Systems	Ch. 8.2, 8.4
	Feb 7	T: Lab 3, Sedimentary structures: Turbidity Currents, Part 2	Handouts, TBA
	Feb 8	W: Exam I	
5	Feb 13	8. M: Eolian and Deltaic Systems	Ch. 8.3, 9.1-9.2
	Feb 14	T: Lab 4, Facies Model Interpretation I	Handouts, TBA
	Feb 15	9. W: Siliciclastic Tidal and Beach Systems	Ch. 9.3-9.6
6	Feb 20	10. M: Siliciclastic Marginal Marine Systems	Ch. 10.1-10.2
	Feb 21	T: Lab 5, Facies Model Interpretation II	Handouts, TBA
	Feb 22	11. W: Pelagic (Deep water) Systems	Ch. 10.3
7	Feb 27	12. M: Carbonate Sedimentary Rocks	Ch. 6
	Feb 28	T: Lab 6, Carbonate Petrology	Handouts, TBA
	Mar 1	13. W: Shallow water carbonate systems	Ch. 11.1-11.5
8	Mar 6	14. M: Evaporites and evaporitic systems	Ch. 7.1-7.2; 11.6
	Mar 7	15. T: Classical Biostratigraphy, Lab 7, Biostratigraphic Methods	Ch. 14
	Mar 8	W: Exam II	
9	Mar 13	16. M: Quantitative Biostratigraphy	Handouts, TBA
	Mar 14	17. T: Stratigraphic Principles and units, Lab 8 Stratigraphic Correlation Lab	Ch. 12.1-12.3 Handouts, TBA
	Mar 15	18. W: Lithostratigraphy; Nature of the Stratigraphic Record	Ch. 12.4-12.6
10	Mar 20	19. M: Cyclostratigraphy	Handouts
	Mar 21	T: Group Research for Field Guides	Handouts, TBA Work on field guides
	Mar 22	W: Stable Isotopes, Ice Volume, and Oxygen Isotope Stratigraphy	Ch. 15.4; Apdx. B Work on field guides
	Mar 25- Apr 2	<i>No classes, Spring Break</i>	
11	Apr 3	20. M: Magnetostratigraphy	Ch. 13.1, 13.4; Ch. 15.1-15.3 Work on field guides
	Apr 4	T: Group Research for Field Guides	Work on field guides
	Apr 5	21. W: Core and Wireline Logging	Handouts, TBA

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			Work on field guides
12	Apr 10	22. M: Plate Tectonics and sedimentation	Ch. 16.1-16.3 Work on field guides
	Apr 11	23. T: Lecture & Lab 9, Geologic Time and Radiometric Dating	Ch. 15.1-15.3; Work on field guides
	Apr 12	24. W: Exam III	
13	Apr 17	25. M: Seismic Stratigraphy	Ch. 13.1-13.3 Work on field guides
	Apr 18	T: Lab 10, Reading and discussion, Papers on "Simplifying the Stratigraphy of Time"	Handouts, TBA Work on field guides
	Apr 19	26. W: Sea level change and sedimentation	Handouts, TBA Work on field guides
14	Apr 24	27. M: Presentation of W. Virginia Field Guide, Part I	Handouts, TBA
	Apr 25	T: Lab 11, Reading and discussion- "More Gaps than Record" and "Marxist Stratigraphy and the Golden Spike"	Handouts, TBA
	Apr 26	28. W: Presentation of W. Virginia Field Guide, Part II	Handouts, TBA
	Apr 28-30	<i>Overnight weekend field trip, Southern West Virginia</i>	
15	May 1	29. M: Sequence Stratigraphy – theory and application	Ch. 13.3; Handouts, TBA
	May 2	T: Lab 12: Reading and discussion- Papers on "Are we now living in the Anthropocene?"	Handouts, TBA
	May 3	30. W: Basin Analysis and Seismic Stratigraphy Readings	Ch. 16.4-16.7, Handouts, TBA
		<i>End of class sessions</i>	
16	May 8	Final Exam, McGilvrey Hall Room 234 10:15 - 12:30 p.m. Monday. May 8, 2017	