

GEOL 546 – CARBONATE SEDIMENTOLOGY AND GEOCHEMISTRY

UNIVERSITY OF TENNESSEE – FALL 2013

BASIC COURSE INFORMATION

- Lectures → MWF 3:35 pm-4:25 pm, Earth & Planetary Sciences, Rm. 405
- Instructor → Dr. Linda Kah (EPS Rm. 214, Ph. 974-6399, lckah@utk.edu)
- Instructor Office Hours → M-F, by e-mail or phone appointment

OVERVIEW AND LEARNING OUTCOMES

Carbonate sediments are extraordinarily complex in that they reflect not only the physical conditions of deposition, but chemical and biological parameters as well. One of the most exciting consequences of this complexity is that the geologic record of carbonate rocks – their distribution in time and space, textural detail, biological makeup, and chemistry – provides a wealth of data about the evolution of Earth surface environments.

Geology 456 is an introductory course for graduate students with four specific goals in mind:

- (1) to afford practical experience in identifying and interpreting carbonate sediments
- (2) to provide a general introduction to the inherently complex nature of carbonate sediments, to aspects of their depositional and diagenetic record, and to their utility in interpreting long- and short-term changes in Earth surface environments
- (3) to provide hands-on experience in the analysis of carbonate materials
- (3) to develop critical skills in reading, reviewing, synthesizing, and presenting scientific information

COURSE FORMAT

LECTURES – The course will be utilize both lectures and individual and group readings on topics of interest.

DISCUSSIONS – Individual students will be expected to act as the primary advocate and/or opponent of assigned papers during class discussions. Copies of individual readings will be available in the main office, and PDFs will be provided on the blackboard site.

SHORT PAPERS – Short (2 page maximum, single spaced) papers will be due several days following the discussion sections. The goal is for each student to provide a concise and thoughtful summary of the discussion topic. Papers should include a statement of the assigned topic, its geologic relevance, and a short discussion of salient issues. There will be opportunities for re-writes/re-grading if the student chooses.

LAB EXERCISES – The laboratory section of this course aims to complement the relatively broad focus of the lectures. The first several lab periods will provide hands-on experience in observing and identifying features of carbonate rocks in hand sample and thin section.

TERM PROJECT – Structure of the term project will be determined on the first day of class. In the past, we have done geochemical analyses of carbonate rocks, term papers, and grant proposals.

GRADE ASSIGNMENT –	50%	Lab Exercises
	20%	Short Papers
	30%	Term Project (15% execution, 15% final product)

Note: Final course grades will be based on class grade distributions. Up to 5% extra credit may be assigned on the basis of participation in class discussions. Students are responsible to make up all missed work.

SYLLABUS OF LECTURE TOPICS

W	Aug. 21	Lecture	Course Introduction	
F	Aug. 23	Lecture	Carbonate classification	
M	Aug. 26	Lecture	Carbonate chemistry, part 1	
W	Aug. 28	Lecture	Carbonate chemistry, part 2	
F	Aug. 30	Lecture	Carbonate chemistry, part 3	
M	Sept. 2	Lecture	Skeletal components, part 1	
W	Sept. 5	Lecture	Skeletal components, part 2	
F	Sept. 6	Discussion	Beginnings of Biomineralization	<i>(Summary due Sept. 9)</i>
M	Sept. 9	NO CLASS	(LABOR DAY HOLIDAY)	
W	Sept. 11	Lecture	Non-skeletal and Neomorphism	
F	Sept. 13	Discussion	Mysteries of Micrite	<i>(Summary due Sept. 16)</i>
M	Sept. 16	Lecture	Micrite & Marine diagenesis, part 1	
W	Sept. 18	Lecture	Marine diagenesis, part 2	
F	Sept. 20	Lecture	Marine diagenesis, part 3	
M	Sept. 23	Lecture	Meteoric and Burial diagenesis	
W	Sept. 25	Lecture	Diagenesis odds and ends	
F	Sept. 27	Discussion	Understanding Ooids	<i>(Summary due Sept. 30)</i>
M	Sept. 30	NO CLASS	(LINDA IN PASADENA)	
W	Oct. 2	NO CLASS	(LINDA IN PASADENA)	
F	Oct. 4	NO CLASS	(LINDA IN PASADENA)	
M	Oct. 7	Lecture	Dilemma of dolomitization, part 1	
W	Oct. 9	Lecture	Dilemma of dolomitization, part 2	
F	Oct. 11	Lecture	Dilemma of dolomitization, part 3	
M	Oct. 14	Lecture	Trace elements, part 1	
W	Oct. 16	Lecture	Trace elements, part 2	
F	Oct. 18	NO CLASS	(FALL BREAK)	
M	Oct. 21	Lecture	Isotopes, part 1	
W	Oct. 23	Lecture	Isotopes, part 2	
F	Oct. 25	Lecture	Isotopes, part 3	
M	Oct. 28	NO CLASS	(GSA IN DENVER)	
W	Oct. 30	NO CLASS	(GSA IN DENVER)	
F	Nov. 1	Discussion	The obscurity of Oxygen	<i>(Summary due Oct. 28)</i>
M	Nov. 4	Lecture	Isotopes and secular variation, part 1	
W	Nov. 6	Lecture	Isotopes and secular variation, part 2	
F	Nov. 8	Discussion	Molar-tooth structure and other weird carbonates	<i>(Summary due Nov. 7)</i>
M	Nov. 7	Discussion	Reefs through time	<i>(one Summary due Nov. 18)</i>
W	Nov. 11	Discussion	Warm/cold-water carbonates	<i>(one Summary due Nov. 18)</i>
F	Nov. 13	Discussion	Calcite-aragonite seas	<i>(one Summary due Nov. 18)</i>
M	Nov. 18	Discussion	Simply speleothems	<i>(one Summary due Nov. 25)</i>
W	Nov. 20	Discussion	Curious cap carbonates	<i>(one Summary due Nov. 25)</i>
F	Nov. 22	Discussion	TBA	<i>(one Summary due Nov. 25)</i>
M	Nov. 25	Final project presentations		
W	Nov. 27	Final project presentations		
F	Nov. 29	– NO CLASS (THANKSGIVING BREAK)		
M	Dec. 2	– Wrap–up discussion		

SYLLABUS OF LECTURE TOPICS

LABORATORY EXERCISES

Week 1	Laboratory	Classification of carbonates
Week 2	Laboratory	Skeletal components
Week 3	Laboratory	Non-skeletal components and ooids neomorphism
Week 4	Laboratory	Carbonate cements and neomorphism
Week 5	Laboratory	Interpreting paragenesis
Week 6	Lab Project	Cathodoluminescence
Week 7	Lab Project	Cathodoluminescence
Week 8	Lab Project	Class project
Week 9	Lab Project	Class project
Week 10	Lab Project	Class project
Week 11	Lab Project	Class project
Week 12	Lab Project	Class project
Week 13	Lab Project	Class project

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Dear Student,

The purpose of this Campus Syllabus is to provide you with important information that is common across courses at UT. Please observe the following policies and familiarize yourself with the university resources listed below. At UT, we are committed to providing you with a high quality learning experience.

I wish you the best for a successful and productive semester.

Provost Susan Martin



UNIVERSITY CIVILITY STATEMENT

Civility is genuine respect and regard for others: politeness, consideration, tact, good manners, graciousness, cordiality, affability, amiability and courteousness. Civility enhances academic freedom and integrity, and is a prerequisite to the free exchange of ideas and knowledge in the learning community. Our community consists of students, faculty, staff, alumni, and campus visitors. Community members affect each other's well-being and have a shared interest in creating and sustaining an environment where all community members and their points of view are valued and respected. Affirming the value of each member of the university community, the campus asks that all its members adhere to the principles of civility and community adopted by the campus: <http://civility.utk.edu/>.

ACADEMIC INTEGRITY

“An essential feature of the University of Tennessee, Knoxville is a commitment to maintaining an atmosphere of intellectual integrity and academic honesty. As a student of the university, I pledge that I will neither knowingly give nor receive any inappropriate assistance in academic work, thus affirming my own personal commitment to honor and integrity.”

DISABILITIES THAT CONSTRAIN LEARNING

“Any student who feels he or she may need an accommodation based on the impact of a disability should contact the Office of Disability Services (ODS) at 865-974-6087 in 2227 Dunford Hall to document their eligibility for services. ODS will work with students and faculty to coordinate reasonable accommodations for students with documented disabilities.”

YOUR ROLE IN IMPROVING TEACHING AND LEARNING THROUGH COURSE ASSESSMENT

At UT, it is our collective responsibility to improve the state of teaching and learning. During the semester, you may be requested to assess aspects of this course either during class or at the completion of the class. You are encouraged to respond to these various forms of assessment as a means of continuing to improve the quality of the UT learning experience.

KEY RESOURCES FOR STUDENTS:

- Undergraduate Catalogs: <http://catalog.utk.edu> (Listing of academic programs, courses, and policies)
- Graduate Catalog: <http://catalog.utk.edu/index.php?catid=2>
- Hilltopics: <http://dos.utk.edu/hilltopics> (Campus and academic policies, procedures and standards of conduct)
- Course Timetable: https://bannersb.utk.edu/kbanpr/bwckschd.p_disp_dyn_sched (Schedule of classes)
- Academic Planning: <http://www.utk.edu/advising> (Advising resources, course requirements, and major guides)
- Student Success Center: <http://studentsuccess.utk.edu> (Academic support resources)
- Library: <http://www.lib.utk.edu> (Access to library resources, databases, course reserves, and services)
- Career Services: <http://career.utk.edu> (Career counseling and resources; HIRE-A-VOL job search system)