

GEOL 462/662 Principles of Sedimentology and Stratigraphy

Lecture: T-Th 11:30 am —12:45 pm, WRI C237

Labs: Section 1: Th 2:30-5:15; Section 2: Fri 2:30-5:15, LFG 105

Concurrent enrollment in the lab is required; you must pass the lab to pass the course.

Instructor: Dr. Steve Rowland

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Office Hours: Tues 2:00-4:00; Weds 10:00-Noon; or by appointment

T.A.: Audrey Warren (email: warrea2@unlv.nevada.edu) Office hours: Thu & Fri, 1:00-2:00 in LFG 105
Audrey's office is SEB 3244.

Required textbook: *Principles of Sedimentology and Stratigraphy* by Sam Boggs, Jr., 5/e, 2012

Additional reading assignments from the primary literature will be made throughout the semester.

Course Description

This course is designed for senior undergraduate (and graduate) students majoring in geology and related disciplines. It will integrate information and skills you have learned in previous classes. The course will provide students with (1) basic knowledge and tools to understand the production, transportation, and deposition of sediments, (2) the development of sedimentary structures and textures, (3) diagenetic features associated with sediment burial and lithification, (4) the history of sea-level change through geologic time, and the mechanisms that cause sea level to change, (5) sedimentary sequences and the mechanisms by which they form, and (6) techniques for studying and graphically characterizing sedimentary rocks.

Field experiences are an important component of this class. Two of the field trips will involve an examination of Paleozoic strata of the Colorado Plateau and southeastern Great Basin, and the third trip will involve an examination of Neoproterozoic strata of the Pahrump Group.

Learning Objectives

When you complete this class you will be able to:

1. Use Adobe Illustrator to draw a stratigraphic column based on your own field observations.
2. Sketch a stratigraphic column of the Paleozoic section of the Grand Canyon from memory, including the name and lithology of each major rock unit and its approximate stratigraphic thickness.
3. Recognize and describe the major types of sedimentary rocks in hand specimen and in thin section.
4. Interpret the depositional environment of sedimentary rocks on the basis of lithological characteristics and sedimentary structures.
5. Apply concepts of stable and radiogenic isotopes to interpret paleoenvironmental changes in Earth history.
6. Explain diagenetic processes and products (such as rock color, compaction, cementation, and the development of concretions) associated with burial and lithification of sedimentary rocks.
7. Explain the geologic history of Southern Nevada and adjacent regions as recorded in the sedimentary rock record.
8. Interpret an electric well log and use well logs to draw a fence diagram to reconstruct the geology of a region.
9. Write a professional-style report about the geology of an area based on subsurface data.

In addition to these measurable objectives, it is one of my teaching objectives that this course will increase your interest in and attraction to sedimentary rocks, and that in future years you will seek out interesting exposures of sedimentary rocks in national parks and other scenic areas, such as Grand Canyon N.P., Zion N.P., Valley of Fire State Park, and Red Rock Canyon National Conservation Area.

Grading

- Quizzes (mostly, but not exclusively, through WebCampus).....10%
- Midterm Exam (March 8).....25%
- Lab work and field projects.....35%
- Final Exam (Thurs, May 10, 10:10 am-12:10 pm).....30%

The final exam will include topics covered on the midterm exam, as well as content from the lab and field trips. Final grades will be assigned on the basis of the traditional scale: A = 90-100%, B = 80-89%, C = 70-79%, D = 60-69%, F ≤ 59%. A plus/minus system may be employed at the instructor's discretion.

Lecture Schedule: The following schedule is tentative. Adjustments will doubtless occur.

<u>Week No.</u>	<u>Week of</u>	<u>Lecture/Discussion Topic</u>	<u>Reading Assignment</u>
1	Jan 15	Intro to Cse/Geologic Time & Stratigraphy/ Case Study #1: Ediacaran and Lower Paleozoic Stratigraphy of the Colorado Plateau and Southern Basin & Range/ weathering & soils/sedimentary textures	Boggs Ch. 15, 3
2	Jan 22	Weathering & Soils/Siliciclastic Rocks/ Case Study #2: Tapeats Ss	Boggs Ch. 1, 5 Hagadorn et al., 2011
3	Jan 29	Carbonate Rocks/Case Study #3: The rise and fall of Cambrian reefs Case Study #4: What is the significance of the Great Unconformity?	Boggs Ch. 6 Peters & Gaines, 2012
4	Feb 5	Chemostratigraphy involving carbon isotopes/ Carbonate and evaporate environments	Boggs Ch. 11
5	Feb 12	Sedimentary structures/Case Study #5: The Navajo/Aztec/Nugget Erg	Boggs Ch. 4
6	Feb 19	Biostratigraphy/Case Study #6: Trilobite biostratigraphy of the Sauk Sequence	Boggs Ch. 14
7	Feb 26	Siliciclastic Depositional Environments	Boggs Ch. 8 & 9
8	Mar 5	Siliciclastic Depositional Environments (cont'd) March 8: Mid-term Exam	Boggs Ch. 10

9	Mar 12	Grand Cyn geology/Case Study #7: Detrital zircon study of the Tapeats Sandstone	Boggs Ch. 12 (p. 355-356) Karlstrom et al. (manuscript)
10	Mar 19	Evaporites, chert, phosphorites, and carbon-rich sedimentary rocks	Boggs Ch. 7
-----SPRING BREAK-----			
11	Apr 2	Pahrump Group strata/Case Study #8: The Kingston Peak Formation and the Snowball Earth hypothesis	Boggs Ch. 2 Prave 1999
12	Apr 9	Sea level change/sequence stratigraphy/ Case Study #9: The Undifferentiated Cambrian Dolomites of Grand Canyon	Boggs Ch. 13 Rowland & Korolev, 2011
13	Apr 16	Lithostratigraphy/instrumental well logs	Boggs Ch. 12
14	Apr 23	Basin analysis/tectonics and sedimentation	Boggs Ch. 16
15	Apr 30	Basin analysis/tectonics (cont'd)/Case Study #10: The Sauk Megasequence Supersequences: Southern Great Basin: Second-order Accommodation Events on the Southwestern Cordilleran Margin Platform	Keller et al. 2012
16		Final Exam: Thursday May 10: 10:10 am	

Academic Misconduct—Academic integrity is a legitimate concern for every member of the campus community; all share in upholding the fundamental values of honesty, trust, respect, fairness, responsibility and professionalism. By choosing to join the UNLV community, students accept the expectations of the Student Academic Misconduct Policy and are encouraged when faced with choices to always take the ethical path. Students enrolling in UNLV assume the obligation to conduct themselves in a manner compatible with UNLV's function as an educational institution.

An example of academic misconduct is plagiarism. Plagiarism is using the words or ideas of another, from the Internet or any source, without proper citation of the sources. See the Student Academic Misconduct Policy (approved December 9, 2005) located at:
<https://www.unlv.edu/studentconduct/student-conduct>.

Copyright—The University requires all members of the University Community to familiarize themselves with and to follow copyright and fair use requirements. You are individually and solely responsible for violations of copyright and fair use laws. The university will neither protect nor defend you nor assume any responsibility for employee or student violations of fair use laws. Violations of copyright laws could subject you to federal and state civil penalties and criminal liability, as well as disciplinary action under University policies. Additional information can be found at: <http://www.unlv.edu/provost/copyright>.

Disability Resource Center (DRC)—The UNLV Disability Resource Center (SSC-A 143, <http://drc.unlv.edu/>, 702-895-0866) provides resources for students with disabilities. If you feel that you have a disability, please make an appointment with a Disabilities Specialist at the DRC to discuss what options may be available to you. If you are registered with the UNLV Disability Resource Center, bring your Academic Accommodation Plan from the DRC to the instructor during office hours so that you may work together to develop strategies for implementing the accommodations to meet both your needs and the requirements of the course. Any information you provide is private and will be treated as such. To maintain the confidentiality of your request, please do not approach the instructor in front of others to discuss your accommodation needs.

Religious Holidays Policy—Any student missing class quizzes, examinations, or any other class or lab work because of observance of religious holidays shall be given an opportunity during that semester to make up missed work. The make-up will apply to the religious holiday absence only. It shall be the responsibility of the student to notify the instructor within the first 14 calendar days of the course for fall and spring courses (excepting modular courses), or within the first 7 calendar days of the course for summer and modular courses, of his or her intention to participate in religious holidays which do not fall on state holidays or periods of class recess. For additional information, please visit:
<http://catalog.unlv.edu/content.php?catoid=6&navoid=531>.

Incomplete Grades—The grade of I—Incomplete—can be granted when a student has satisfactorily completed three-fourths of course work for that semester/session but for reason(s) beyond the student's control, and acceptable to the instructor, cannot complete the last part of the course, and the instructor believes that the student can finish the course without repeating it. The incomplete work must be made up before the end of the following regular semester for undergraduate courses. Graduate students receiving "I" grades in 500-, 600-, or 700-level courses have up to one calendar year to complete the work, at the discretion of the instructor. If course requirements are not completed within the time indicated, a grade of F will be recorded and the GPA will be adjusted accordingly. Students who are fulfilling an Incomplete do not register for the course but make individual arrangements with the instructor who assigned the I grade.

Library Resources---Students may consult with a librarian on research needs. For this class, the subject librarian is https://www.library.unlv.edu/contact/librarians_by_subject. UNLV Libraries provides resources to support students' access to information. Discovery, access, and use of information are vital skills for academic work and for successful post-college life. Access library resources and ask questions at <https://www.library.unlv.edu/>.

Tutoring and Coaching—The Academic Success Center (ASC) provides tutoring, academic success coaching and other academic assistance for all UNLV undergraduate students. For information regarding tutoring subjects, tutoring times, and other ASC programs and services, visit <http://www.unlv.edu/asc> or call 702-895-3177. The ASC building is located across from the Student Services Complex (SSC). Academic success coaching is located on the second floor of the SSC (ASC Coaching Spot). Drop-in tutoring is located on the second floor of the Lied Library and College of Engineering TEB second floor.

UNLV Writing Center—One-on-one or small group assistance with writing is available free of charge to UNLV students at the Writing Center, located in CDC-3-301. Although walk-in consultations are sometimes available, students with appointments will receive priority assistance. Appointments may be made in person or by calling 702-895-3908. The student's Rebel ID Card, a copy of the assignment (if possible), and two copies of any writing to be reviewed are requested for the consultation. More information can be found at: <http://writingcenter.unlv.edu/>.

Rebelmail—By policy, faculty and staff should e-mail students' Rebelmail accounts only. Rebelmail is UNLV's official e-mail system for students. It is one of the primary ways students receive official university communication such as information about deadlines, major campus events, and announcements. All UNLV students receive a Rebelmail account after they have been admitted to the university. Students' e-mail prefixes are listed on class rosters. The suffix is always @unlv.nevada.edu. Emailing within WebCampus is acceptable.

Final Examinations—The University requires that final exams given at the end of a course occur at the time and on the day specified in the final exam schedule. See the schedule at: <http://www.unlv.edu/registrar/calendars>.

GEOL 462 Lab Schedule

<u>Week No.</u>	<u>Week of</u>	<u>Lab</u>	<u>Field</u>
1	Jan 15	Construct Grain Size Cards	
2	Jan 22	Siliciclastic Rocks	
3	Jan 29	Carbonate Rocks	Sat Feb 3: Measure a section of the Tonto Gp at Frenchman Mtn.
4	Feb 5	Use Adobe Illustrator to draw strat col	
5	Feb 12	Sedimentary Structures	
6	Feb 19	Biostratigraphically important fossils	
7	Feb 26	Thin section petrology of siliciclastic rocks	
8	Mar 5	Thin section petrology of carbonate rocks	
9	Mar 12	No lab. Prepare for Grand Canyon trip	Fri-Sat-Sun Mar 16-18: Grand Canyon
10	Mar 19	Work on Grand Canyon strat col (Adobe Illus)	
-----Spring Break-----			
11	Apr 2	No lab this week	Sat Apr 7: Field Trip to Pahrump Group etc.
12	Apr 9	Electric Well Log Project	
13	Apr 16	Electric Well Log Proj. (this is Geosymposium week, so no formal lab meeting)	
14	Apr 23	Complete Electric Well Log Project	
15	Apr 30	No lab this week	