Course Syllabus:
Clastic Depositional Systems and Sequence Stratigraphy

McCoy College of Science, Mathematics, and Engineering
Lecture - GEOS 5323 Section 101
Fall 2022
MWF 8 – 8:50 am | Bolin Hall 125

Laboratory Section

GEOL 5323 Section 11A: M 4 – 5:50 pm | Bolin Hall 125

Contact Information

Instructor: Dr. Steven J. Rosscoe
Office: Bolin Hall 131a
Office hours: MWF 10 – 11 am | T 9 am – 11 am | By Appointment
Office phone: (940) 397-4448
E-mail: steven.rosscoe@msutexas.edu

Course Description

This course covers all aspects of terrestrial and marine siliciclastic depositional systems and stratigraphy. The course will discuss characteristics of geologic and modern systems across a range of environments (deltas, lakes, shorelines, barrier islands, alluvial and submarine fans, turbidite systems, etc.). Students will develop an understanding of clastic sequence stratigraphy, identifying cycles, and the mechanisms responsible for deep-water sedimentation. Other topics include: paleoclimate reconstruction, gravity flow processes, water-rock interactions, subsurface applications, and siliciclastic petrology. Lecture will be supplemented by applied learning with thin sections, core, and hand samples. Concepts will be reinforced with advanced readings and discussions of topics related to siliciclastic depositional systems, including how sequence stratigraphic methods are used in petroleum migration.

Course Learning Objectives

The successful completion of this course will be evaluated around the following course learning objectives. Each of these course learning objectives include aspects of both content knowledge and skills development. Students will:

1. Recognize textural, stratigraphic, and mineralogical characteristics of siliciclastic sediments and rocks in all terrestrial and marine depositional environments.

2. Recognize distinctive sedimentary stratigraphic sequences and facies relationships and their relationship to modern depositional systems and their ancient analogs.

3. Write analytical papers, with appropriate scientific quality illustrations, of significant clastic deposits in West-Central Texas studied through extensive laboratory and field exercises.

4. Develop proper laboratory skills and analytical techniques that are essential to the study of the siliciclastic depositional systems (sieve analysis, textural analysis, paleoenvironment interpretation, correlation, and sequence and parasequence recognition and interpretation).

Textbook & Instructional Materials

Required Textbook: Reading, Third Edition – Sedimentary Environments: Processes, Facies and Stratigraphy. ISBN 9780632036271

Materials for Fieldwork (Used for Field Trip):

- Rite in the Rain Field Notebook (Field Pattern Recommended) Amazon
- Rock Hammer (Rock Pick or Brick Hammer) Amazon
- Metric Measuring Tape (Must Have Metric) Amazon

Material for Lab Work (Used in Lab):

- Mechanical Pencils (white erasers are best)
- White Eraser Block
- Colored Pencils (at least basic colors but a larger variety is useful)
- Ruler (metric)
- Calculator (scientific or graphing)

Grading

The formal grade for this course is determined by your performance on lecture exams, reading quizzes, reading discussions, laboratory activities, and a laboratory midterm and laboratory final exam.

Table 1: Points allocated to each assignment type. For more details see assignment descriptions below.

Assignments (Quantity)	Points
Lecture Examinations (4)	400
Field Study Projects (2)	200
Laboratory Activities (12)	240
Total Points	840

Table 2: Total points for final grade.

Grade	Points
A	756 and up
B	672 to 755
C	588 to 671
D	504 to 587
F	Less than 504

Lecture Examinations (Online)

During the semester there will be four examinations given as assignments through the D2L course management system (100 points each). These examinations are given at the end of each our major course units (see course schedule). The examinations will consist of 5 short essay questions (10 points each) and two long essay questions (25 points each). The short essay questions will relate to the major concepts of the unit. The first long essay will be an interpretation of field/lab/stratigraphic data provided to you. The second long essay will be an evaluation of a published paper on a rock unit related to the unit topic. Exams will be released on the last day of the unit. You will need to type and upload your answers in D2L by the due date (one week later).

The final exam will release on the last day of class and will be due at the end of the day on Wednesday Dec. 7, this is the day of our final examination block. During the final examination block time (8 to 10 am) I will host an open (student-driven) discussion about the interpretation materials and provided reading for the examination, but attendance during the block is not required.

Examination	Unlock Date/Time	Due Date/Time
Exam 1: Alluvial Depositional Systems Fluvial and Alluvial Fan Environments (Chapter 3)	9/16 at 6:00 pm	9/23 at 11:59 pm
Exam 2: Marine Depositional Systems Clastic Coasts, Shallow Seas, and Deep Seas (Chapters 6, 7, and 10)	10/14 at 6:00 pm	10/21 at 11:59 pm
Exam 3: Other Clastic Depositional Systems Aeolian, Glacial, Lakes, and Volcaniclastic (Chapters 4, 5, 11, 12)	11/4 at 6:00 pm	11/11 at 11:59 pm
Exam 4: Clastic Sequence Stratigraphy Sequence Stratigraphy (Chapter 2)	12/2 at 6:00 pm	12/7 at 11:59 pm

Field Study Projects (Field and Online)

Fieldwork and the associated lab work and presentation of field data and interpretations are the nuts and bolts of the geosciences. Whether you want to be a geochemist, volcanologist, paleontologist, the skills of sedimentary and stratigraphic fieldwork are essential. In this course we will complete two Saturday field investigations that will be the basis upon which you will write two comprehensive field reports on the Cretaceous Antlers Formation and the Triassic Dockum Group.

General Field Trip Information (Trip 1):
Dates: October 1st, 2022 (Saturday)
Where: Abilene/Buffalo Gap, Texas
Materials Needed: Weather appropriate clothing, picnic lunch, Rite in the Rain field notebook, pencil.

General Field Trip Information (Trip 2):
Dates: October 22nd, 2022 (Saturday)
Where: Silverton, Texas
Materials Needed: Weather appropriate clothing, picnic lunch, Rite in the Rain field notebook, pencil.

In the field you will create measured sections and gather an abundance of field data and photographs. You will need to find scientific articles on the strata and read about the geology of the field areas using the MSU library resources. You will investigate field specimens that you collect with the skills and techniques learned throughout the semester in the lab. Once completed with your field and lab work you will write a professional, GSA journal of Geology-style article discussion the stratigraphy and depositional environment of the unit in question. The paper will include a set of required professional illustrations including a localities map, digitally generated annotated measured sections, specimen photographs, annotated photographs, and field sketches. The due dates for each paper can be found on the due dates table on the last page of this document.

Lab Activities (In Class)

The laboratory portion of the course requires the completion of 12 laboratory activities. Most laboratory periods will begin with an introduction of important materials and procedures (usually about a half hour) with a laboratory activity to be completed in the lab. There will typically be questions to be answered after you complete the activity. The lab worksheet is due at the start of the next laboratory period. Labs will be graded and returned the following week. Each lab is worth 20 points. Due dates for each lab can be found on the table of due dates (last page of this document).

Extra Credit

There is no extra credit for this course. Mastering this material is imperative to functioning as a geologist, no other material or activities can supplement.

Late Work

Most assignments in this course have at least a week of lead time before their due dates. It is your responsibility to complete the assignment before the due date. If you have something that will prevent you from completing the assignment on the day it is due, get it done earlier. No late work will be accepted. Missed labs and examinations may be made up with a legal, paper-documented, excuse. See below for make-up work policy.

Make-Up Work/Tests

For legal, paper-documented, excuses make-ups for labs and examinations can be completed. Discussions cannot be made up; discussions require interaction with your peers in real time. Make-up work should be arranged for in advance wherever possible. The instructor will give you a new deadline that is reasonable for the course timeline. No make-up work will be allowed beyond 10 days past the original deadline.

Instructor Class Policies

The following policies are the policies that are integral for our successful completion of the course and should be read thoroughly. If you have any questions, please see the instructor.

Academic Honesty

Academic dishonesty is considered cheating, collusion, and plagiarism. Any unauthorized assistance during the completion of assignments, using on aids beyond those authorized for an assignment, or the use of other people or services to complete assignments is considered cheating. Working with others in a way that is not authorized by the instructor to complete assignments is considered to be collusion. Plagiarism is the use of another person’s materials (by paraphrase or direct quotation) without giving them full and clear acknowledgement. The use of material prepared by another person or agency selling term papers and academic materials is also considered plagiarism.

If a student is caught cheating, colluding, or plagiarizing on any assignment the assignment grade will automatically be a zero. Two or more violations will result in failure of the course.

Classroom Civility and Inclusion

The best environment for learning is an environment where everyone is respected and valued for who they are. In my classroom, we are striving for full inclusion. Anyone using derogatory language toward an individual or group is in violation of this policy and will be asked to leave. We are all here together,

learning together, this is not a place for hate of any kind. Be civil, treat each other with respect, and do your best listen to each other in any conversation.

Electronic Devices

Use of electronic devices for taking notes is allowed in my classroom. Recording (audio or video) is not allowed unless approved by the instructor for educational purposes. The use of social media or streaming anything is not an appropriate use of technology during class. If your use of technology in a non-educational way is being disruptive to your peers, you will be asked to leave.

Course Grade and Grade Bumps

In my courses, a grade is earned by accumulating points throughout the semester. The grade you earn in the course is determined by the number of points you earn through the timely completion of assignments. As such, at the end of the semester, there are no grade bumps given out. Do not ask how or if you can be bumped up to the next letter grade, if you haven't earned the points you will not be able to get that grade.

If you believe there to be an error in the calculation of your grade, whether it is on a specific assignment or the whole course feel free to ask me to re-evaluate and double check. I will do so happily. For specific assignments, be prepared to give me specific reasons you feel the grade is wrong (which wrong answer do you think was right, etc.).

Desire-to-Learn (D2L)

Extensive use of the MSU D2L learning management system is required in this course. Each student is expected to be familiar with this program as it provides a primary source of communication regarding assignments, examination materials, and general course information. You can log into D2L through the MSU Homepage. If you experience difficulties, please contact the technicians listed for the program or contact your instructor.

Computer Requirements

Taking this course involves the completion of all lecture exams, reading quizzes, and discussions in the course learning management system (D2L). This class requires you to have access to a computer (with Internet access) to complete and upload your assignments. It is your responsibility to have (or have access to) a working computer in this class. ***Assignments and tests are due by the due date, and personal computer technical difficulties will not be considered a reason for the instructor to allow students extra time to submit assignments, tests, or discussion postings.*** Computers are available on campus in various areas of the buildings as well as the Academic Success Center. **Your computer being down is not an excuse for missing a deadline!!** There are many places to access your class! Our online classes can be accessed from any computer in the world which is connected to the internet. Contact your instructor immediately upon having computer trouble. If you have

technical difficulties in the course, there is also a student helpdesk available to you. The college cannot work directly on student computers due to both liability and resource limitations however they are able to help you get connected to our online services. For help, log into D2L**.**

University Policies and Information

The following information and policies apply to this course. Please read each of these policies and ask your instructor if you have any questions.

Important Dates

Last day for term schedule changes: August 25, 2022
Deadline to file for December graduation: September 26, 2022
Deadline to file for May graduation: October 3, 2022
Last Day to drop with a grade of "W:" October 24, 2022

Attendance

Students are expected to attend all meetings of the classes in which they are enrolled. Although in general students are graded on intellectual effort and performance rather than attendance, absences may lower the student's grade where class attendance and class participation are deemed essential by the faculty member. In those classes where attendance is considered as part of the grade, the instructor should so inform students of the specifics in writing at the beginning of the semester in a syllabus or separate attendance policy statement. An instructor who has an attendance policy must keep records on a daily basis. The instructor must give the student a verbal or written warning prior to being dropped from the class. Instructor's records will stand as evidence of absences. A student with excessive absences may be dropped from a course by the instructor. Any individual faculty member or college has the authority to establish an attendance policy, providing the policy is in accordance with the General University Policies.

Change of Schedule

A student dropping a course (but not withdrawing from the University) within the first 12 class days of a regular semester or the first four class days of a summer semester is eligible for a 100% refund of applicable tuition and fees. Dates are published in the Schedule of Classes each semester.

Refund and Repayment Policy

A student who withdraws or is administratively withdrawn from Midwestern State University (MSU) may be eligible to receive a refund for all or a portion of the tuition, fees and room/board charges that were paid to MSU for the semester. HOWEVER, if the student received financial aid (federal/state/institutional grants, loans and/or scholarships), all or a portion of the refund may be returned to the financial aid programs. As described below, two formulas (federal and state) exists in determining the amount of the refund. (Examples of each refund calculation will be made available upon request).

Services for Students with Disabilities

In accordance with Section 504 of the Federal Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990, Midwestern State University endeavors to make reasonable accommodations to ensure equal opportunity for qualified persons with disabilities to participate in all educational, social, and recreational programs and activities. After notification of acceptance, students requiring accommodations should make application for such assistance through Disability Support Services, located in the Clark Student Center, Room 168, (940) 397-4140. Current documentation of a disability will be required in order to provide appropriate services, and each request will be individually reviewed. For more details, please go to Disability Support Services.

Campus Carry Rules/Policies

Effective August 1, 2016, the Campus Carry law (Senate Bill 11) allows those licensed individuals to carry a concealed handgun in buildings on public university campuses, except in locations the University establishes as prohibited. The new Constitutional Carry law does not change this process. Concealed carry still requires a License to Carry permit, and openly carrying handguns is not allowed on college campuses. For more information, visit Campus Carry Rules and Policies

Active Shooter

The safety and security of our campus is the responsibility of everyone in our community. Each of us has an obligation to be prepared to appropriately respond to threats to our campus, such as an active aggressor. Please review the information provided by MSU Police Department regarding the options and strategies we can all use to stay safe during difficult situations. For more information, visit Safety / Emergency Procedures.

Smoking/Tobacco Policy

College policy strictly prohibits the use of tobacco products in any building owned or operated by MSU. Adult students may smoke only in the outside designated-smoking areas at each location.

Alcohol and Drug Policy

To comply with the Drug Free Schools and Communities Act of 1989 and subsequent amendments, students and employees of Midwestern State are informed that strictly enforced policies are in place which prohibits the unlawful possession, use or distribution of any illicit drugs, including alcohol, on university property or as part of any university-sponsored activity. Students and employees are also subject to all applicable legal sanctions under local, state and federal law for any offenses involving illicit drugs on University property or at University-sponsored activities.

Grade Appeal Process

Following the appropriate procedure for grade appeals requires you to speak to your instructor first, so talk to your instructor. Students who wish to appeal a grade should consult the Midwestern State University Undergraduate Catalog.

Course Schedule
Notice: Changes in the course syllabus, procedure, assignments, and schedule may be made at the discretion of the instructor.

Week	Monday	Wednesday	Friday
Week 1 **8/22 to 8/26**	Introduction *Reading Ch. 1*	Fluvial Systems *Reading Ch. 2*	Fluvial Systems *Reading Ch. 2*
	Lab 01 – Grain-Size Distributions and Data Collection		
Week 2 **8/29 to 9/2**	Fluvial Systems *Reading Ch. 2*	Fluvial Systems *Reading Ch. 2*	Fluvial Systems *Reading Ch. 2*
	Lab 02 – Interpretation of Grain-Size Data		
Week 3 **9/5 to 9/9**	**No Class** ***Labor Day***	Fluvial Systems *Reading Ch. 2*	Fluvial Systems *Reading Ch. 2*
	No Lab ***Labor Day***		
Week 4 **9/12 to 9/16**	Alluvial Fans *Reading Ch. 2*	Alluvial Fans *Reading Ch. 2*	Alluvial Fans *Reading Ch. 2*
	Lab 03 – Grain-Shape Analysis		
Week 5 **9/19 to 9/23**	Coastal Systems *Reading Ch. 6*	Coastal Systems *Reading Ch. 6*	Coastal Systems *Reading Ch. 6*
	Lab 04 – Mineral Composition		
Week 6 **9/26 to 9/30**	Coastal Systems *Reading Ch. 6*	Coastal Systems *Reading Ch. 6*	Coastal Systems *Reading Ch. 6*
	Lab 05 – Formal Clastic Rock Descriptions		
Week 7 **10/3 to 10/7**	Shallow Seas *Reading Ch. 7*	Shallow Seas *Reading Ch. 7*	Shallow Seas *Reading Ch. 7*
	Lab 06 – Paleocurrent Indicators		
Week 8 **10/10 to 10/14**	Deep Seas *Reading Ch. 10*	Deep Seas *Reading Ch. 10*	Deep Seas *Reading Ch. 10*
	Lab 07 – Paleoenvironment Indicators		
Week 9 **10/17 to 10/21**	Glacial Systems *Reading Ch. 11*	Glacial Systems *Reading Ch. 11*	Glacial Systems *Reading Ch. 11*
	Lab 08 – Outcrops, Cores, and Geophysical Logs		

Course Schedule Continued
Notice: Changes in the course syllabus, procedure, assignments, and schedule may be made at the discretion of the instructor.

Week	Monday	Wednesday	Friday
Week 10 10/24 to 10/28	Lakes *Reading Ch. 4*	Volcanics *Reading Ch. 12*	Wrap Up
	Lab 09 – Recognizing Sea Level Adjustments		
Week 11 10/31 to 11/4	Sea Level & Accom. *Coe Ch. 3 (PDF)*	Sea Level & Climate *Coe Ch. 5 (PDF)*	Sea Level & Tectonics *Coe Ch. 5 (PDF)*
	Lab 10 – Sequences and Parasequences		
Week 12 11/7 to 11/11	Sediment Supply *Coe Ch. 4 (PDF)*	Sed. Supply Influence *Coe Ch. 5 (PDF)*	Stacking Patterns *Coe Ch. 4 (PDF)*
	Lab 11 – Seismic Stratigraphy and Sequence Interpretation		
Week 13 11/14 to 11/18	T-R Cycles *Coe Ch. 4 (PDF)*	Systems Tracts *Coe Ch. 4 (PDF)*	Lowstand LST *Coe Ch. (PDF)*
	Lab 12 – Wheeler Diagrams		
Week 14 11/21 to 11/25	Transgressive TST *Coe Ch. 4 (PDF)*	**No Class *Thanksgiving***	**No Class *Thanksgiving***
	No Lab *Thanksgiving*		
Week 15 11/28 to 12/2	Highstand HST *Coe Ch. 4 (PDF)*	Falling Stage FSST *Coe Ch. 4 (PDF)*	Why Sequence Strat?
	Work Period		
Final 12/7	Final Exam Block: Wed. Dec. 7, 8:00 am – 10:00 am		

Course Due Dates in Chronological Order
The following table lists the due dates of each assignment in the course.

Due Date	Assignment
M 08/29	Lab 1: Grain-Size Distributions and Data Collection
M 09/19	Lab 2: Interpretation of Grain Size Data
M 09/19	Lab 3: Grain Shape Analysis
F 09/23	Examination 1: Alluvial Depositional Systems
M 09/26	Lab 4: Mineral Composition
Sa 10/01	Field Trip: Antlers Formation (Abilene, Texas)
M 10/03	Lab 5: Formal Clastic Rock Descriptions
M 10/10	Lab 6: Paleocurrent Indicators
M 10/17	Lab 7: Paleoenvironment Indicators
F 10/21	Examination 2: Marine Depositional Systems
Sa 10/22	Field Trip: Dockum Group (Silverton, Texas)
M 10/24	Lab 8: Outcrops, Cores, and Geophysical Logs
F 10/28	Antlers Formation Paper
M 10/31	Lab 9: Recognizing Sea Level Adjustments
M 11/07	Lab 10: Sequences and Parasequences
F 11/11	Examination 3: Other Clastic Depositional Systems
M 11/13	Lab 11: Seismic Stratigraphy and Sequence Interpretation
M 11/21	Lab 12: Wheeler Diagrams
F 12/02	Dockum Group Paper
W 12/07	Examination 4: Sequence Stratigraphy