

Course Syllabus: Physical Geology
McCoy College of Science, Mathematics, and Engineering
GEOS 3434-201 Structural Geology
Spring 2022

Contact Information

Instructor: Dr. Andrew Katumwehe

Office: Bolin 102A

Lecture: T, R 9:30-10:50 AM RM 115

Office hours: Tue, Wed, Th and Friday: 3:00 – 4:00PM and by appointment

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Course Description

This course introduces students to the processes of deformation, and the application of continuum mechanics in assessing deformation. It outlines the relationship between stress and strain and how these are preserved in the geological record. Describing and analyzing brittle and ductile structures including fractures, faults and folds. It also helps in understanding the relationship between mesoscopic planar and linear fabrics in relation to major brittle and ductile structures. This involves an analysis of regions of structural associations.

Other specific objectives:

- Understand stress and deformation
- Understand the information preserved in structural features
- Learn to quantify and mathematically manipulate structural information
- Understand structures in light of tectonism and orogenesis.
- Become proficient in extending limited two-dimensional information into a regional three-dimensional picture.

Required Textbook & Instructional Materials

Fossen, H. 2016. Structural Geology. Cambridge University Press. 463 p. ISBN: 978-1107-05764-7

Stephen M. Rowland, Earnest M. Duebendorfer and Ilsa M Schiefelbein. Structural Analysis and Synthesis. A laboratory Course in Structural Geology. Blackwell Publishing Ltd. ISBN: 978-4051-1652-7

Student Handbook

Refer to: [Student Handbook 2017-18](#)

Academic Misconduct Policy & Procedures

Academic Dishonesty: MSU is committed to maintaining the highest standards of integrity and ethical conduct. This level of ethical behavior and integrity will be maintained in this course. Participating in a behavior that violates academic integrity (e.g., unauthorized collaboration, plagiarism, multiple submissions, cheating on examinations, helping another person cheat, unauthorized advance access to examinations, altering or destroying the work of others, and altering academic records) will result in an official academic sanction. Violations may subject you to disciplinary action including the following: receiving a failing grade on an assignment, examination or course, receiving a notation of a violation of academic integrity on your transcript, and being suspended from the University. You have the right to appeal the charge. Additional guidelines on procedures in these matters may be found in the Office of Student Conduct.

Grading

Lecture Portion of course = 60% of final grade. Exam 1 = 10% of final grade; Lecture Exam 2 = 15% of final grade; Final Exam = 15% of final grade; lecture quizzes 20%. Lab Portion of course = 40% of final grade. Exams and Lab Quizzes may be made up only if (1) you have a written excuse as to why you missed the exam and (2) you notified Dr. Katumwehe in advance that you would miss the exam. A missed exam or quiz must be made up within one week or you may receive a grade of zero. However, there may be extreme circumstances as to why prior notice was not given, these will be evaluated on a case-by-case basis. Oversleeping is not an acceptable reason! Lecture exams, lab quizzes, and lab completion grades are curved" by a simple arithmetic adjustment so that the class grade average is between 76-80%. However, this only applies to students whose lab and class attendance is unquestionable and have submitted their quizzes, exams, lab assignments and research paper. All components of your final grade must be completed by April 27 2022. The homework assignments will be posted on D2L and during laboratory lectures. Homework due dates are listed in the syllabus. The Table below (next page) summarizes the grading policy for this course.

Table 1: Grade points as discussed in the grading section above.

Graded Items	Contribution to Final Course Grade
Exam 1	15%
Exam 2	20%
Final Exam 3	25%
Lecture Quizzes	20%
Lab	40%

Table 2: Final grades are normally rounded up to the nearest integer before assigning the final course letter grade. For example, a final calculated course grade of 89.8% will be rounded up to a final course grade of 90%.

Grade	Points
A	90 and above
B	80-89
C	70-79
D	60-69
F	Less than 60

Homework

I will issue specific assignments in class and lab. Completed work may be remitted to the professor in person, through his office mailbox (Bolin 102A), or by electronic submission. All submissions must be neat and legible.

Note: You may not submit a paper for a grade in this class that already has been (or will be) submitted for a grade in another course, unless you obtain the explicit written permission of me and the other instructor involved in advance.

Lab Assignments

See Grading Section for details – All Lab Assignments must be submitted to your lab TA during your regular lab section meeting.

Lab Attendance Policy – Important!

Students who **miss three** or more lab section meetings may be dropped from the course by the instructor. Students are responsible to work with their lab section TA to make up any missed material in a timely fashion. Students must notify their lab TA and Dr. Andrew Katumwehe by email in advance of missing a lab section. Students who leave lab sections and class early may be marked absent.

Exams

See Grading Section for details – The class requires completion of a midterm and final examination. Both are timed exams; exam 1, midterm are in-class 50 minute exam, the final is a 2-hour exam. The instructor will provide additional information a week prior to the scheduled date. Three lecture exams are included in your course grade; see Grades section for details.

Lecture (Attendance) Extra Credit

Limited extra credit opportunities will be available on an irregular and random basis during the lecture portion of the course. Generally, these opportunities will involve a short written response to a question or problem posed during the lecture or more often than not, simply your signature on an attendance sheet. (Therefore, bring paper and pen/pencil to lectures!). There will be 10 to 14 regular extra credit opportunities during the semester, take note that the final curve will be based on class attendance, participation, submission of all the assignments, lab works and final research paper.

Special Extra Credit

Special extra credit opportunities may also be announced during the semester. These opportunities, worth up to a total of one (1) special extra credit (added to your final calculated course grade) typically have included the scheduled Geology Colloquium talks or other special lectures or film showings on campus that pertain to geology or participation in Undergraduate Research presentations or evaluations.

Late Work

Late work will be accepted through 04/21/2022 please refer to the conditions above. However, the following penalties will apply in all cases of late submittals: 10% for one day past due; 20% for two days past due; 30% for three days past due; after three days a grade of zero may be recorded. No course assignments will be accepted after 04/27/2022.

Important Dates on the spring 2022 schedule of classes.

Last Day to drop this course with a grade of "W" is 4pm, March 21, 2022 Drops after this date will receive grades of "F." Refer to academic calendar: [Drops, Withdrawals & Void](#)

Desire-to-Learn (D2L)

The MSU D2L program is a part of this course. Lectures, review materials, and course information will be available through D2L. 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.

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 (ADA) 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. 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](#).

College Policies

Campus Carry Rules/Policies are given here: [Campus Carry Rules and Policies](#)

Smoking/Tobacco Policy

College policy strictly prohibits the use of tobacco products in any building. Adult students may smoke outside and only in 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 Northwestern 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

Students who wish to appeal a grade should consult the Northwestern State University [Undergraduate Catalog](#)

Notice

Changes in the course syllabus, procedure, assignments, and schedule may be made at the discretion of the instructor. Changes will be communicated to all students through [D2L](#). Please check the course news on a regular basis for schedule updates and your school email.

Course schedule detail is given on the next three pages. The first table lists lecture topics, textbook readings, and the three lecture exams. The second table lists the dates for the lab topics, three lab quizzes, homework assignment due dates, and self-assessment assignments.

Course Schedule – Lecture Topics and **Exams**, Text Reading (Page 1 of 3)

Date	Topic and Topic Number	Textbook Pages
11-Jan	Course Overview and Introduction	Pages
13- Jan	Structural analysis	Pages 1-22
17-Jan	Martin Luther Day	
18- Jan	Plate Tectonics - Part 1	Pages 1-22
20- Jan	Deformation 1	Pages 1-22
25- Jan	Deformation II	Pages 25-55
27- Jan	Strain in rocks	Pages 59-70
01-Feb	Stress	Pages 73-80
03- Feb	Stress in the lithosphere	Pages 83-98
08- Feb	Rheology	Pages 101-119
10- Feb	Review Exam 1	
15- Feb	Exam 1	
17- Feb	Fractures	Pages 123-149
17- Feb	Faults I	Pages 177-216
17- Feb	Faults II	Pages 177-216
22-Feb	Kinematics of brittle regime	Pages 221-231
24- Feb	Deformation at micro scale	Pages 221-231
01- March	Folds and Folding I	Pages 221-231
01-March	Folds and Folding I	Pages 257-278
03-March	Folds and Folding II	Pages 257-278
03- March	Folds and Folding II	Pages 257-278
03- March	Foliation and cleavage	Pages 283-297
08- March	Foliation and cleavage	Pages 283-297
10- March	Review Exam 2	
14- 19 March	Spring break - No Classes	
21- March	Exam 2	
24- March	Lineations I	Pages 301-311
24- March	Lineations II	Pages 301-311
29- March	Boudinage I& II	Pages 315-325
31-March	Stereonets I & II	Pages 329-351
05-April	Structural Domains I &II	Pages 329-351
07-April	Contractual Domains I	Pages 355-373

Course Schedule – Lecture Topics and Exams, Text Reading (Page 3 of 3)

Date	Topic and Topic Number	Textbook Pages
07-April	Contractual Domains II	Pages 355-373
12-April	Extensional regimes I	Pages 377-396
12-April	Extensional regimes	Pages 377-396
14-April	Strike slip systems I	Pages 401-414
15-April	Holiday	
19-April	Strike slip systems I	Pages 401-414
21-April	Strike slip systems II	Pages 401-414
26-April	Strike slip systems II	Pages 401-414
29-May	Final Exam Review	
26-April		Last Day to Submit Any Late Assignments!
04-May 08:00am- 10:00am	THIRD EXAM (will cover all material presented in the lecture) - 20% of grade. Room and time per University Final Exam Schedule.	

Course Schedule –for Labs, Lab Quizzes, Homework, Research Paper, and Assessments (Page 1 of 2)

Date (Week of date listed unless otherwise noted as a specific date)	Lab Topic, Lab Quiz
Jan-11	Lab #1:Introduction
Jan-18	Lab #2: Structural contours.
Jan-25	Lab #3:Strain measurements
Feb-01	Lab #4:Mohr circle I
Feb-08	Lab #5:Mohr circle II
Feb-15	Lab #6:Three point problems
Feb-22	Lab #7:Fault Analysis
Feb-22	Lab #8: Fault Analysis II
March-01	Lab #9: Fold Geometry
March-08	Lab #10: Normal strike, slip Faults and Thrust faults
March-22	Lab #11: Stereonets
March-29	Lab#12: Structural Analysis I
April-5	Lab#13: Structural Analysis II