

ES2201B: Structural Geology (Jan. 2014)

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Office hours: by appointment

Textbooks:

Davis, G.H., Reynolds, S.J., and Kluth, C.F. 2011. Structural Geology of Rocks and Regions, 3rd edition. John Wiley & Sons, Inc.

Hobbs, B. E., Means, W. D. and Williams, P. F. 1976. An Outline of Structural Geology. John Wiley & Sons. New York. [out of print but available from the library; used copies can be found at a reasonable price from online bookstores]

Textbooks will be used as an aid. Tests will be based on matters covered in lectures and labs. Nonetheless, you are strongly encouraged to read all of the suggested materials as they will provide supporting and/or supplemental information.

Course Description and Goals:

Structural Geology is concerned with geological structures like folds, faults, and shear zones in Earth's lithosphere. Most structures are products of ancient deformation. Geologists characterize these features. The information is used for land use, resources exploration and mining, and above all to understand the past processes of planet Earth. This is a first course in structural geology. We will cover: 1) how to observe and describe structures, 2) how to collect, process, and present structural data, 3) how to apply basic mechanical concepts to understand the formation of structures. After completing this course, the students are expected to be able to:

1. interpret geological maps in 3D using cross sections and block diagrams
2. analyze the geometry of structures using stereographic and orthographic projections
3. interpret structural evolution, based on structural geometry, kinematics, and mechanical principles
4. correlate small scale structures with regional tectonics

Pre-/Co-requisite: ES2200A/B

Please note "Unless you have either the requisites for this course or written special permission from your Dean to enroll in it, you may be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites."

Course Format: 2 lecture hours, 3 laboratory hours

Lectures: Tuesdays and Thursdays 9:30AM to 10:30AM, P&AB 34

Labs: Mondays 2:30PM – 5:30PM, BGS 1015

Grading:

Lab assignments	20%
Lab Test	20%
Lecture exams 15% x 2	30%
Final Exam	30%

Conduct:

- Please make every effort to be on time for classes and labs.
- If you are late or have to leave before a class is over, please try not to distract others as much as possible.
- Absolutely no cell phone rings during lectures or labs.
- No emailing or texting during lectures.

“Scholastic offenses are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offense, at the following Web site: www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf”

Absence from course commitments

A. Attendance/Examinations

Attendance to lectures and labs are required. Any student who, in the opinion of the instructor, is absent too frequently from class or laboratory periods, will be reported to the Dean of the Faculty of Science (after due warning has been given). On the recommendation of the department concerned, and with the permission of the Dean, the student will be debarred from taking the regular examination in the course. The Dean will communicate that decision to the Dean of the Faculty of Registration.

A student may be debarred from writing the final examination for failure to maintain satisfactory academic standing throughout the course. This includes unsatisfactory performance on lab assignments and/or mid-term exams.

B. Absence for medical illness:

Students must familiarize themselves with the Policy on Accommodation for Medical Illness: <https://studentservices.uwo.ca/secure/index.cfm>

Statement from the Dean’s Office, Faculty of Science:

If you are unable to meet a course requirement due to illness or other serious circumstances, you must provide valid medical or other supporting documentation to the Dean's office as soon as possible and contact your instructor immediately. It is the student's responsibility to make alternative arrangements with their instructor once the accommodation has been approved and the instructor has been informed. In the event of a missed final exam, a "Recommendation of Special Examination" form must be obtained from the Dean's Office immediately. For further information please see: www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_medical.pdf.

A UWO Student Medical Certificate (SMC)* is required where a student is seeking academic accommodation due to illness. This documentation should be obtained at the time of the initial consultation with the physician or walk-in clinic. An SMC can be downloaded from:

http://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf

Hard copies are available from Academic Counselling in the Dean's Office

Failure to Appear at an Examination

Students who fail to appear for an examination will not be allowed to write the examination paper thus missed. Students should report this irregularity immediately to the office of their dean or, in cases of evening or Saturday examinations, to the Office of the Registrar. They may, with the approval of the chair of the department concerned, petition their dean for permission to write a Special Examination.

A Special Examination is any examination other than the regular examination, and it may be offered only with the permission of the Dean of the Faculty in which the student is registered, in consultation with the instructor and Department Chair. Permission to write a Special Examination may be given on the basis of compassionate or medical grounds with appropriate supporting documents. A Special Examination must be written at the University or an Affiliated University College no later than 30 days after the end of the examination period involved. To accommodate unusual circumstances, a date later than this may be arranged at the time permission is first given by the Dean of the Faculty. The Dean will consult with the instructor and Department Chair and, if a later date is arranged, will communicate this to Registrarial Services. If a student fails to write a scheduled Special Examination, permission to write another Special Examination will be granted only with the permission of the Dean in exceptional circumstances and with appropriate supporting documents. In such a case, the date of this Special Examination normally will be the scheduled date for the final exam the next time the course is offered.

Accessibility Statement

Please contact me if you require material in an alternative format or if you require any other arrangements to make this course more accessible to you. You may also wish to contact Services for Students with Disabilities (SSD) at 661-2111 x 82147 for any specific question regarding an accommodation.

Course Schedule

Date	Activity/Lecture Topic	Reading
Jan 7	Lecture 1: Introduction and Course Setup	Chapter 1 and Part III (DR ¹); Introduction (HMW ²)
Jan 9	Lecture 2: Attitude of Planes and Lines	Part III (DR)
Jan 13	Lab One	
Jan 14	Lecture 3: Geological Contacts and Primary Structures	Chapter 3 (HMW)
Jan 16	Lecture 4: Geological Maps	
Jan 20	Lab Two	Pages 662-669 (DR)
Jan 21	Lecture 5: Map Patterns of Uniformly-dipping Beds	
Jan 23	Lecture 6: Cross Sections and Block Diagrams	
Jan 27	Lab Three	
Jan 28	Lecture 7: Stereographic and Equal-area Projections	Pages 691-708 (DR); Pages 483-501 (HMW); handouts
Jan 30	Lecture 8: Joints, Veins, Dykes, and Sills	
Feb 3	Lab Four	
Feb 4	Lecture 9: Faults: Geometrical Elements	
Feb 6	Lecture 10: Fault Classification and Field Identification	
Feb 10	Lab Five	
Feb 11	Lecture 11: Summary and Review	Chapters 5 & 6 (DR), Chapter 7 (HMW)
Feb 13	Exam One	
Feb 24	Lab Six	
Feb 25	Lecture 12: Ductile Faults -- Shear Zones	
Feb 27	Lecture 13: Fault-related Rocks	
Mar 3	Lab Seven	
Mar 4	Lecture 14: Folds: Geometrical Elements	
Mar 6	Lecture 15: Fold Classification and Map Patterns	Chapter 7 (DR); Chapters 4, and 8 (HMW)
Mar 10	Lab Eight	
Mar 11	Lecture 16: Generations, Styles, and Overprinting	
Mar 13	Lecture 17: Fabrics in Rocks: Foliations and Lineations	
Mar 17	No Lab	
Mar 18	Lecture 18: Foliations Associated with folds	Chapters 8 & 9 (DR); Chapters 5 & 6 (HMW)
Mar 20	Lecture 19: Fabrics in Ductile shear zones	
March 24	Lab Exam	
March 25	Exam Two	
Mar 27	Lecture 20: Principles of Structural Analysis	Chapters 2, 3, and 4 (DR); Chapter 1 (HMW)
Apr 1	Lecture 21: Structures and Tectonic Synthesis	
Apr 3	Lecture 22: Stress and Strain Concept	
Apr 8	Lecture 23: Mechanical Aspects of Rock Deformation	
Apr 10	Lecture 24: Review and summary	

Lab exercises: There are 8 labs for this course. The first lab will be on Monday Jan 13. Each lab assignment is due before the following lab begins. Please *do not* use a new lab session to complete previous lab assignments. Overdue labs will not be accepted for credit unless with prior permission.

¹ DR stands for the textbook by Davis, GH and Reynolds, SJ.

² HMW stands for the textbook by Hobbs, BE, Means, WD, and Williams, PF.