Required Textbook: *Structural Geology of Rocks and Regions* by Davis & Reynolds, 3rd Ed.

Class Time and Place: Monday, Wednesday, Friday 09:00 - 09:50 a.m., CS-111.

Lab Time and Place: Wednesday, 12:00 - 01:50 p.m., CS 226.

Lab Instructor: Dr. Valeriu Murgulet, Email: valerio.murgulet@tamucc.edu

Office Hours: Mondays and Wednesdays 10:30 a.m. to noon, Fridays 10:30a.m. to 12:30 p.m. or by appointment.

Course Description
Geology 4421 is an introduction to the study of structures found in the lithosphere, their description, nomenclature, and the geologic processes that form them. The course also introduces the student to numerical and graphical quantitative solution of structural problems. After a brief review of both non-tectonic and tectonic geological structures, the course will cover the basics of structural analysis (stress, strain and the relationship between the two). In the second half of the course, we will focus on the description and analysis of the chief classes of tectonic structures (faults, folds, shear zones, microstructures). The course will conclude with a look at plate tectonic processes from a structural perspective. Laboratory exercises will complement the material presented during the lectures. Prerequisites for this course are GEOL3411, MATH2413, and PHYS1401 or 2425.

Learning Objectives
Upon successful completion of this course, the student
– should have obtained a good understanding of the principles of structural analysis,
– should be familiar with the main types of geologic structures and their analysis,
– should be able to apply various laboratory techniques to solve structural problems,
– and should be able to apply the principles of structural geology within a broader context.

Major Course Requirements:

Evaluation and Grade Assignment
Your final grade will be based on a % curve from the following point distribution:
A) Exams: Mid-Term Exams (Lecture and Lab)  
   Final Exam (Lecture only)  
   3@100 points each: 300 points  
B) Chapter Quizzes: 6@10 points each (lowest grade dropped): 50 points  
C) Lab Assignments: 12@10 points each: 120 points  
Total: 470 points

A perfect score in this course would be to earn all 470 points available. At the end of the semester, I will take the highest point total in the class and will use that high score to calculate the percentage bonus required to bring this individual’s total points up to 470. That percentage bonus is then applied to everyone’s individual total.

Final grading will be as follows:
A = 470-421 points  B = 420-374 points  C = 373-327 points  D = 326-280 points  F < 280 points

**Exams and Chapter Quizzes**
Exams can only be taken during the scheduled time, except in cases of emergencies. Documented proof is required of such emergencies. There will be NO make up exams or quizzes for unscheduled and unexcused absence! If you know you are going to miss a class or an exam and have a valid excuse, let me know BEFORE the fact, NOT after (by that time I already know…)! Make-up exams cannot be taken after the graded test has been given back to the class. There will be no exceptions!
Chapter Quizzes happen randomly and are used to encourage regular attendance in class. The odds of a Chapter Quiz occurring on a given day are inversely proportional to the number of students present in class that day. Quizzes will consist of a short series of multiple-choice or short answer questions that can be answered in approximately 5-10 minutes at the end of the class period. Chapter Quizzes may include material covered in previous lectures or in the reading assignment for that day. So please be prepared!

**Laboratory Work**
Lab assignments are generally due after one week (please use the outline below to help you plan ahead). Each lab will be worth 10 points. There is a “late fee” of one point per day for assignments that are not submitted in time! So please have the previous week's lab completed before you come to the next lab!
If a laboratory is missed, you should make immediate arrangements to make up the laboratory work. Most laboratory work is difficult to reschedule due to availability of study materials. Some laboratory instruction cannot be conveniently repeated outside of the scheduled laboratory time.

**Class Policies**
While attendance of the lectures will not be recorded by the instructor on a regular basis, **regular attendance is essential to the successful completion of this course.** Treat your co-students (and instructor) with respect. The use of cell phones, pagers, mp3 players, headphones and similar electronic devices is not allowed in class.

**Academic Integrity/Plagiarism**
University students are expected to conduct themselves in accordance with the highest standards of academic honesty. Academic misconduct for which a student is subject to penalty includes all forms of cheating, such as illicit possession of examinations or examination materials, falsification, forgery, complicity or plagiarism. (Plagiarism is the presentation of the work of another as one’s own work.) In this class, academic misconduct or complicity in an act of academic misconduct on an assignment or test will result in a failing grade.

**Dropping a Class**
I hope that you never find it necessary to drop this or any other class. However, events can sometimes occur that make dropping a course necessary or wise. Please consult with me before you decide to drop to be sure it is the best thing to do. Should dropping the course be the best course of action, you must initiate the process to drop the course by going to the Student Services Center and filling out a course drop form. Just stopping attendance and participation WILL NOT automatically result in your being dropped from the class. Friday, April 12 is the last day to drop a class with an automatic grade of “W” this term.

**Grade Appeals**
As stated in University Rule 13.02.99.C2, Student Grade Appeals, a student who believes that he or she has not been held to appropriate academic standards as outlined in the class syllabus,
equitable evaluation procedures, or appropriate grading, may appeal the final grade given in the course. The burden of proof is upon the student to demonstrate the appropriateness of the appeal. A student with a complaint about a grade is encouraged to first discuss the matter with the instructor. For complete details, including the responsibilities of the parties involved in the process and the number of days allowed for completing the steps in the process, see University Rule 13.02.99.C2, Student Grade Appeals, and University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures. These documents are accessible through the University Rules Web site at http://www.tamucc.edu/provost/university_rules/index.html. For assistance and/or guidance in the grade appeal process, students may contact the Office of Student Affairs.

Disabilities Accommodations
The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please call or visit Disability Services at (361) 825-5816 in Corpus Christi Hall, Room 116.
If you are a returning veteran and are experiencing cognitive and/or physical access issues in the classroom or on campus, please contact the Disability Services office for assistance at (361) 825-5816.

Reading Assignments
All reading assignments are to be read prior to the class in which the material will be discussed. Your text is accompanied by a Study Guide, which can assist you in understanding the content of the textbook. It also provides valuable guidelines regarding general study skills, note taking, and test preparation.

Important Dates
January 23: First day of classes
October 19: Lecture Mid-Term Exam
October 26: Lab Mid-Term Exam
April 12: Last day to drop a class
May 07: Last day of classes
May 15: Final Exam (08:00 - 10:30 a.m.)
**Tentative Lecture and Lab Schedule, Reading Assignments:**

The following lecture schedule will be followed as closely as possible although some revisions may become necessary during the semester.

### January

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>Lecture/Assignment</th>
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<tbody>
<tr>
<td>01/23</td>
<td>Wed</td>
<td>Lab No Lab</td>
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<tr>
<td>01/25</td>
<td>Fri</td>
<td>Primary and Secondary Structures: Ch. 1, pp. 7-29 and 706-711.</td>
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<tr>
<td>01/28</td>
<td>Mon</td>
<td>Primary and Secondary Structures: Ch. 1, pp. 7-29 and 706-711.</td>
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<td>01/30</td>
<td>Wed</td>
<td>Fractures and Joints I: Chapter 5.</td>
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<tr>
<td>01/30</td>
<td>Wed</td>
<td>Lab Attitudes of Lines and Planes</td>
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### February

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<tr>
<th>Date</th>
<th>Day</th>
<th>Lecture/Assignment</th>
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<tbody>
<tr>
<td>02/01</td>
<td>Fri</td>
<td>Fractures and Joints II: Chapter 5.</td>
</tr>
<tr>
<td>02/04</td>
<td>Mon</td>
<td>Fractures and Joints III: Chapter 5.</td>
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<tr>
<td>02/06</td>
<td>Wed</td>
<td>Faults I: Ch. 6</td>
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<tr>
<td>02/06</td>
<td>Wed</td>
<td>Lab Outcrop Patterns and Structure Controls I</td>
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<tr>
<td>02/08</td>
<td>Fri</td>
<td>Faults II: Ch. 6</td>
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<td>02/11</td>
<td>Mon</td>
<td>Faults III: Ch. 6</td>
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<tr>
<td>02/13</td>
<td>Wed</td>
<td>Faults IV: Ch. 6</td>
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<tr>
<td>02/13</td>
<td>Wed</td>
<td>Lab Outcrop Patterns and Structure Controls II</td>
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<tr>
<td>02/15</td>
<td>Fri</td>
<td>Dynamic Analysis – The Basics: Ch. 3, pp. 90-105.</td>
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<tr>
<td>02/18</td>
<td>Mon</td>
<td>Dynamic Analysis – The Basics: Ch. 3, pp. 90-105.</td>
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<td>02/20</td>
<td>Wed</td>
<td>Stress I: Ch. 3</td>
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<tr>
<td>02/20</td>
<td>Wed</td>
<td>Lab Interpretation of Geologic Maps</td>
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<tr>
<td>02/22</td>
<td>Fri</td>
<td>Stress II: Ch. 3</td>
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<td>02/25</td>
<td>Mon</td>
<td>Stress III: Ch. 3</td>
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<tr>
<td>02/27</td>
<td>Wed</td>
<td>Stress IV: Ch. 3</td>
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<tr>
<td>02/27</td>
<td>Wed</td>
<td>Lab Stereographic Projections I</td>
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### March

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<tr>
<td>03/01</td>
<td>Fri</td>
<td>Displacement and Strain I: Ch. 2</td>
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<tr>
<td>03/04</td>
<td>Mon</td>
<td>Displacement and Strain II: Ch. 2</td>
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<tr>
<td>03/06</td>
<td>Wed</td>
<td>Displacement and Strain III: Ch. 2</td>
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<tr>
<td>03/06</td>
<td>Wed</td>
<td>Lab Stereographic Projections II</td>
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<tr>
<td>03/08</td>
<td>Fri</td>
<td>Displacement and Strain IV: Ch. 2</td>
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<tr>
<td>03/11-03/15</td>
<td>SPRING BREAK</td>
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<tr>
<td>03/18</td>
<td>Mon</td>
<td>Displacement and Strain V: Ch. 2</td>
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<tr>
<td>03/20</td>
<td>Wed</td>
<td>Lab Stereographic Projections III</td>
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<tr>
<td>03/22</td>
<td>Fri</td>
<td>Mechanics of Fracturing: pp. 226-239.</td>
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<td>03/25</td>
<td>Mon</td>
<td>Lecture Mid-Term Exam</td>
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<td>03/27</td>
<td>Wed</td>
<td>The Mohr Envelope: Ch. 6, pp. 286-305.</td>
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<tr>
<td>03/27</td>
<td>Wed</td>
<td>Lab Mid-Term Exam</td>
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<tr>
<td>03/29</td>
<td>Fri</td>
<td>Deformation Mechanisms and Microstructures I: Ch. 4</td>
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### April

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<tr>
<th>Date</th>
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<tr>
<td>04/01</td>
<td>Mon</td>
<td>Deformation Mechanisms and Microstructures II: Ch. 4</td>
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<tr>
<td>04/03</td>
<td>Wed</td>
<td>Deformation Mechanisms and Microstructures III: Ch. 4</td>
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Wed 04/03     Lab     Stereographic Analysis of Folded Rocks I
Fri 04/05     Folds I: Ch. 7
Mon 04/08     Folds II: Ch. 7
Wed 04/10     Folds III: Ch. 7
Wed 04/10     Lab     Stereographic Analysis of Folded Rocks II
Fri 04/12     Foliations and Lineations I: Ch. 9
Mon 04/15     Foliations and Lineations II: Ch. 9
Wed 04/17     Foliations and Lineations II: Ch. 9
Wed 04/17     Lab     Faults
Fri 04/19     Geometric Analysis of Foliation and Lineation: pp. 511-520.
Mon 04/22     Geometric Analysis of Foliation and Lineation: pp. 511-520.
Wed 04/24     Shear Zones and Sense-of-Shear Indicators I: Ch. 10
Wed 04/24     Lab     Brittle Failure I
Fri 04/26     Shear Zones and Sense-of-Shear Indicators II: Ch. 10
Mon 04/29     Shear Zones and Sense-of-Shear Indicators III: Ch. 10

May
Wed 05/01     The Big Picture – Structure and Active Tectonics I: Ch. 11
Wed 05/01     Lab     Brittle Failure II
Fri 05/03     The Big Picture – Structure and Active Tectonics II: Ch. 11
Mon 05/06     Review
Wed 05/15     Final Exam (08:00 – 10:30 a.m.)

Drafting Supplies
The lab exercises (and partially the lectures) will require the use of some basic drafting supplies. The following is a list of what’s needed. Please bring these items with you to each session.

⚠️ Stereonets (will be provided)
⚠️ Mechanical pencil, lead size of 0.5 mm or finer (required)
⚠️ Colored pencils (at least six colors, required)
⚠️ 12” ruler with mm markings (required)
⚠️ Protractor (required)
⚠️ Triangle (optional)
⚠️ Compass (required)
⚠️ Tracing paper (one tablet, can be shared, required)
⚠️ Graph paper (one tablet, can be shared, required)
You will also need a calculator and, most importantly, an eraser. Get a good one!