This course focuses on sedimentary rocks and the stratigraphic record. Topics covered include the origin and classification of sediments and sedimentary rocks, sedimentary structures, diagenesis, and basin analysis. Students are introduced to the principles and practice of stratigraphy. Prerequisite: Geology 1401 or 1402.

Professor: Dr. J.I. "Joe" Satterfield
Office: VIN 122
Phone: 486-6766 (office)
942-2242 (Department office)
E-mail: joseph.satterfield@angelo.edu
Office hours: Monday, Wednesday, Friday: 8:00 – 9:00 am, 11:00 am – 12:00 noon
Tuesday, Thursday: 9:00 – 11:00 am
(or contact me to set up a meeting at almost any time)

Texts:

not required, sources of many handouts:
- Compton, R.R., 1985, Geology in the Field: John Wiley & Sons, 398 p. (this is also the textbook for GEOL 3102; Field Methods)
- AAPG Memoir 627 Sandstone Depositional Environments
- AAPG Memoir 656 Carbonate Depositional Environments

Grading:
- 2 exams over lecture, text, and project topics: 10% each
- 1 comprehensive final exam, 12%
- 1 hand-sample “lab practical” on rock and mineral identification, 8%
- 12 graded lab projects, including weekend field trip, 5% each (60% total)

Each student will schedule a brief individual meeting with Dr. Joe after Exam 1!

Blackboard website contains lecture slides, answers to lab assignments and class projects, practice problems, web links to scenic areas mentioned in class and lab, and your official grades.

Required Lab and Field Equipment

1. Geology field book (I will place an order for all interested and pay shipping)
2. Hand lens, 10x (10x Bausch & Lomb Hastings Triplet recommended)
3. Grain size template
**Student Learning Outcomes**

1) To study in more detail sedimentary rocks introduced in Physical and Historical Geology, such as how to describe and measure them, how to interpret the ancient environments they formed in, and how to correlate rocks and time across long distances. The geology of sedimentary rocks is the single most important topic to petroleum geologists.

2) To get hands-on experience in describing and interpreting rocks so that you will have a solid background when taking summer field camp, a 5-week field course (GEOL 3600), when working on your own research project (GEOL 4391), when taking geology courses in graduate school, and when employed as a professional geologist or engineer. The ultimate goal: a good working knowledge of how to describe and interpret whatever sedimentary rocks you encounter anywhere in the world. We will emphasize what can be done in the field with outcrops and hand samples.

3) To learn how to use standard geology tools in the field and the classroom. Tools used include: geophysical logs from oil wells, hand lens, sieves, petrographic microscopes (an introduction), Brunton Compass, and Jacob’s Staff.

Learning outcomes will be assessed by exams, a lab practical, and graded lab projects

**Field Trips**

You are encouraged to attend more than one field trip. You are required to attend one. The field trip project will be your Lab 12. Tentative schedule:

1) **Permian Eastern Shelf and Cretaceous Edwards Plateau Sedimentology and Stratigraphy**, March 3: This trip will be a version of the 2016 SW AAPG Field Trip led by Steve Shaw, Bruce Swartz, Rob Raney, Emily Stoudt, Clayton Moss, James Ward, your instructor, and several other recent ASU graduates.

2) **Cambrian Montoya Group, Franklin Mountains El Paso**, Sunday, April 8. SW AAPG Field trip led by Dr. Mike Pope, Texas A&M sedimentologist. Saturday, April 7 in El Paso: short course on Well Log Analysis of Unconventional Reservoirs by Dr. George Asquith, Texas Tech. Trip and course are part of SW AAPG Annual Meeting (Southwest AAPG Annual Convention site). Register early: trip will fill up! We will arrange an informal visit to UTEP Geological Sciences as well.

**Join GEO and AAPG!**

One of your most rewarding responsibilities as a Geoscience major or minor is the chance to participate in activities of GEO, our organization of geology students at ASU, and the AAPG, the American Association of Petroleum Geologists, an international professional organization. GEO is a Student Chapter of the AAPG. GEO has supper meetings Wednesdays at 7:00 in VIN 139. The last Wednesday of the month we meet together with the San Angelo Geological Society (SGS) and host a significant geology talk by an outside speaker. GEO dues are $15.00 / semester. AAPG student membership is free! To join AAPG fill out membership application at AAPG website AAPG membership is a course requirement!
<table>
<thead>
<tr>
<th>Week</th>
<th>Lecture/Discussion topics</th>
<th>Labs</th>
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<tbody>
<tr>
<td>I 1/17, 1/19</td>
<td>Introduction to GEO, AAPG, SGS, GSA, SEPM Introduction: Sedimentology, Stratigraphy (Ch 1) Graphic logs (Lab Manual Ch 2) Well-logging basics (Ch 22)</td>
<td>1: Review outside of common minerals in sedimentary rocks</td>
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<tr>
<td>II 1/22, 1/24, 1/26</td>
<td>How to interpret SP, GR, and resistivity curves (Ch 22) Terrigenous Clastic Sediments: Gravel, Sand, Mud (Ch 2) 1/26: Steve Shaw teaches</td>
<td>2: Susan Peak Oil Field Project Constructing a subsurface cross-section from well logs</td>
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<td>III 1/29, 1/31, 2/2</td>
<td>Sandstone textures (Ch 2)</td>
<td>2: Continued</td>
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<td>IV 2/5, 2/7, 2/9</td>
<td>Biogenic and Chemical Sediments (Ch 3)</td>
<td>3: Sandstones and conglomerates in hand sample</td>
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<td>V 2/12, 2/14, 2/16</td>
<td>Transport Processes and Sedimentary Structures (Ch 4)</td>
<td>4: Constructing a cross-section and stratigraphic column from geologic map of Big Bend National Park</td>
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<td>VI 2/19, 2/21, 2/23</td>
<td>Field Sedimentology (Ch 5) 2/21: EXAM 1: Ch 1 - 5, 22 (Geophysical logging only) Aeolian Environments (Ch 8)</td>
<td>5: Cretaceous measured section, W. Robert Lee</td>
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<td>VII 2/26, 2/28, 3/2</td>
<td>Rivers and Alluvial Fans (Ch 9) Lakes (Ch 10)</td>
<td>6: Sieving, grain-size analysis of beach, river samples</td>
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<tr>
<td>VIII 3/5, 3/7, 3/9</td>
<td>Deltas (Ch 12) Clastic Coasts and Estuaries (Ch 13)</td>
<td>6: Continued</td>
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<tr>
<td>3/12 – 3/16</td>
<td>SPRING BREAK</td>
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<tr>
<td>IX 3/19, 3/21, 3/23</td>
<td>Shallow Marine Carbonate, Evaporite Environments (Ch 15)</td>
<td>7: Sedimentary Petrography: Introduction to the petrographic microscope</td>
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<tr>
<td>X 3/26, 3/28</td>
<td>Deep Marine Environments (Ch 16)</td>
<td>8: Other sedimentary rocks in hand sample</td>
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<tr>
<td>XI 4/2, 4/4, 4/6</td>
<td>Post-depositional Structures and Diagenesis (Ch 18) Stratigraphic Concepts and Lithostratigraphy (Ch 19)</td>
<td>9: PAPER SUMMARY DUE Permian basin paper discussion</td>
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<tr>
<td>XII 4/11, 4/13</td>
<td>4/9: SW AAPG Annual Convention, El Paso Biostratigraphy (Ch 20) 4/11: EXAM 2: Chapters 9, 10, 12, 13, 15, 16, 18</td>
<td>10: Carbonate rocks in hand sample</td>
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<tr>
<td>XIII 4/14, 4/16</td>
<td>Dating and Correlation Techniques (Ch 21)</td>
<td>11: Facies mapping</td>
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<td>XIV 4/21, 4/23, 4/25</td>
<td>Sequence Stratigraphy and Sea Level Change (Ch 23)</td>
<td>Review all hand samples</td>
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<tr>
<td>XV 4/28, 4/30, 5/2</td>
<td>Sedimentary Basins (Ch 24)</td>
<td>HAND SAMPLE QUIZ: SEDIMENTARY ROCKS AND MINERALS</td>
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<td>XVI 5/9</td>
<td>5/6, 8:00 pm: Informal review 5/9, 8:00 – 10:00 am: FINAL EXAM (comprehensive)</td>
<td>NOTE: LAB 12 IS THE FIELD TRIP PROJECT</td>
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Notes

1. Lab projects submitted after the due date will receive a 10-point deduction!

2. Work turned in after graded work is returned to others will not be graded.

(These are professional ethics issues)

3. Know the Honor Code. Angelo State University expects its students to maintain complete honesty and integrity in their academic pursuits. Students are responsible for understanding the Academic Honor Code, which is contained in both print and web versions of the Student Handbook.

Persons with disabilities which may warrant academic accommodations must contact the Student Life Office, Room 112 University Center, in order to request such accommodations prior to any accommodations being implemented. You are encouraged to make this request early in the semester so that appropriate arrangements can be made.

A student who intends to observe a religious holy day should make that intention known in writing to the instructor prior to the absence. A student who is absent from classes for the observance of a religious holy day shall be allowed to take an examination or complete an assignment scheduled for that day within a reasonable time after the absence.