

Meeting times:	Lecture: Tuesday and Thursday, 10:50 - 12:05 Lab: Thursday, 1:40 - 4:20	114 Bretske Hall 114 Bretske Hall
Instructor:	J. W. Mies, Ph.D. e-mail: Jonathan-Mies@utc.edu web page: http://www.utc.edu/Faculty/Jonathan-Mies/	105 Bretske Hall Office phone: 425-4606
Text:	van der Pluijm, Ben A. & Marshak, Stephen, 2004, Earth Structure: An Introduction to Structural Geology and Tectonics, WCB/McGraw-Hill, 656 p., ISBN: 0-393-92467-X	
Prerequisites:	GEOL 342	Corequisite: GEOL 451 Lab (Section 500)
Recommended:	Introductory Physics (concepts of mass, acceleration, force, pressure, etc.) and a familiarity with basic trigonometry, as is provided by MATH 145	
Hours:	4 credit hours, 5 contact hours	
Description:	GEOL 451 Structural Geology, provides an introduction to the theory and principles of rock deformation and classifications of common geologic structures. Conceptual, theoretical, and historical aspects of structural geology are covered in the lecture, whereas the laboratory focuses on methods of analysis and problem solving. Topics are discussed in the contexts of case studies and plate tectonics. This course is intended to be the undergraduate student's first course in structural geology.	

TENTATIVE LECTURE SCHEDULE

Date	Tu	Th	Topic	Chapter
Aug	22		Introductions, fundamental concepts of struct. geol.	1, 2
		24	Force and stress	3, notes
	29		Stress (cont'd)	3, notes
		31	Stress (cont'd)	3, notes
Sep	5		Deformation and strain	4
		7	Strain (cont'd)	4
	12		Strain (cont'd), rheology—stress-strain relations	4, 5
		14	Rheology (cont'd)	5
	19		Rheology (cont'd), review	5, 1 - 5
		21	EXAM 1	1 - 5
	26		Brittle deformation	6
		28	Brittle deformation (cont'd)	6
Oct	3		Brittle deformation (cont'd), joints and veins	6, 7
		5	Joints and veins (cont'd)	7
	10		Joints and veins (cont'd), faults and faulting	7, 8
		12	Faults and faulting (cont'd)	8
	17		Faults and faulting (cont'd)	8
		19	Faults (cont'd), Ductile deformation processes	8, 9
	24		Fall Break - no class	
		26	Ductile deformation processes (cont'd)	9
			Oct. 27, 28, 29—Weekend field trip	
	31		Ductile deformation processes (cont'd), review	9, 6-9, [1-5]
Nov		2	EXAM 2	6 - 9 [1 - 5]
	7		Folds and folding	10
		9	Folds and folding (cont'd)	10
			Nov. 11, 12—Weekend field trip	
	14		Folds (cont'd), fabrics — foliation and lineation	10, 11
		16	Fabrics (cont'd)	11
	21		Thanksgiving Holiday - no class	
		23	Thanksgiving Holiday - no class	
	28		Fabrics (cont'd), ductile shear zones	11, 12
		30	Ductile shear zones, review	12,10-12,[1-9]

TENTATIVE LECTURE SCHEDULE (CONT'D)

Dec	7	FINAL EXAM, Thursday, Dec. 7, 11:00 am - 1:00 pm	10-12, [1-9]
	12	LAB PRACTICAL EXAM, Tues., Dec. 12, 11:00 - 1:00	

TENTATIVE LABORATORY SCHEDULE

Date	Tu	Topic
Aug	22	Orthographic projection I — planes, tabular units, strike, dip, etc.
	29	Spherical projection I — planes, poles, strike, dip, apparent dip, etc.
Sep	5	Strain experiments
	12	Practical strain measurement
	19	Orthographic projection II — lines, planes, trend, plunge, rake, etc.
	26	Spherical projection II — lines, planes, advanced applications, etc.
Oct	3	LAB EXAM 1 — Orthographic and spherical projection
	10	Local field trip to collect structural data
	17	Structure contour, form-line contour, isopach, and isochore maps
	24	Fall Break - no class
	31	Map patterns I — planes, tabular units, and topography
Nov	7	Map patterns II — folds and faults
	14	Cross sections I — cross section construction
	21	Thanksgiving Holiday - no class
	28	Cross sections II — retrodeformation and balanced cross sections
Dec	12	LAB FINAL EXAM, Tues., Dec. 12, 11:00 - 1:00

FIELD TRIPS

Field trips are planned for October 10 (Chattanooga area, all afternoon), MONTH DAYS (weekend), and MONTH DAYS (weekend). Potential destinations for weekend trips include the Grandfather Mountain window and vicinity (Blue Ridge of western North Carolina), the Great Smoky Mountains (Tuckaleechee, Long Branch, Shooting Creek structural windows, etc.), the eastern Blue Ridge in northeast Georgia and the adjacent Carolinas (Chunky Gal, Woodall Shoals, etc.), and the eastern Blue Ridge in Alabama (Erin slate at Erin, Hollins line, deformed marble at Sylacauga, etc.). Weekend trips will probably entail 1 or 2 nights camping.

SUPPLEMENTAL TEXTS AND READINGS

Some other texts that students may find useful for this class are on reserve in Lupton library. These include:

Billings, M. P., 1972, Structural Geology, Prentice-Hall, 606 p. ISBN 0-13-853846-8

This older text, once in very common use, remains an excellent reference for its descriptive content and its laboratory exercises, which emphasize graphic constructions.

Davis, G. H., 1984, Structural Geology of Rocks and Regions, John Wiley & Sons, NY, 492 p. ISBN 0-471-09267-3

Ragan, D. M., Structural Geology, 1st (1968), 2nd (1973), or 3rd (1985) editions, John Wiley & Sons. ISBN 0-471-08043-8

This laboratory manual does an excellent job of explaining orthographic and spherical projections, and map patterns. 1st edition is on reserve.

Ramsay, J. G. & Huber, M. I., 1983, The Techniques of Modern Structural Geology: Volume 1: Strain Analysis, Academic Press, 307 p. ISBN 0-12-576921-0 (or 0-12-576901-6)

This laboratory manual is commonly referenced for its excellent strain experiments and exercises on strain analysis.

Spencer, E. W., 1988, Introduction to the Structure of the Earth, McGraw-Hill, 551 p.
ISBN 0-07-060198-4

2nd edition on reserve

Suppe, John, 1985, Principles of Structural Geology, Prentice-Hall, 537 p. ISBN 0-13-710500-2

Supplementary notes, particularly on the topic of stress, are available from Blackboard, UTC's online course delivery system. (See the pertinent section of this syllabus.)

WEB RESOURCES

The Structural Geology Page

http://www.science.smith.edu/departments/Geology/Structure_Resources/

Teaching Resources in Structural Geology

<http://earth.leeds.ac.uk/learnstructure/index.htm>

Structural Geology Techniques

<http://www.uwgb.edu/dutchs/STRUCTGE/LABMAN.HTM>

Stereonet and other software by Rick Almendinger

http://www.geo.cornell.edu/geology/classes/RWA/GS_326/GEOL326.html#DL_Progr

GSA Structural Geology and Tectonics Division

<http://rock.geosociety.org/sgt/index.html>

Structural Geology Portal

http://www.structural-geology-portal.com/welcome_page.html

Structural Geology Course Resources on the Internet

<http://www.uh.edu/~jbutler/anon/anoncoursestructure.html>

Visualizing Structure

<http://www.geology.sdsu.edu/visualstructure/>

Teaching Structural Geology in the 21st Century

<http://serc.carleton.edu/NAGTWorkshops/structure/index.html>

GRADES AND RELATED MATTERS

The *final numerical grade* for the class will be computed as follows.

12 %	Exam 1 (September 21)	_____	x 0.12 =	_____.
15 %	Exam 2 (November 2)	_____	x 0.15 =	_____.
17 %	Final Exam (Thursday, Dec. 7, 11:00 am - 1:00 pm)	_____	x 0.17 =	_____.
12 %	Avg. of 2 to 4 problem sets	_____	x 0.12 =	_____.
12 %	Lab Exam 1 (October 3)	_____	x 0.12 =	_____.
12 %	Lab Final Exam (Tues., Dec. 12, 11:00 am - 1:00 pm)	_____	x 0.12 =	_____.
12 %	Avg. of 6 to 8 laboratory exercises	_____	x 0.12 =	_____.
8 %	Misc. assign., quizzes, attendance, participation	_____	x 0.08 =	_____.
			<i>TOTAL (Final numerical grade) =</i>	_____.

The *final letter-grade* for this class will conform to the following scale, based upon the computed *final numerical grade*.

F≤59.9, D=60-69.9, C=70-79.9, B=80-89.9, A=90-100

PROBLEM SETS AND LABORATORY EXERCISES

Students will be required to complete several problem sets and laboratory exercises, which will be graded. Averages of these scores will be considered in the final grade for the class, as described above.

Students are required to show their computational work and their graphic constructions on these assignments.

EXAMS

Exams will be comprehensive, meaning that each exam will cover all material that precedes it. The second exam and the final exam will emphasize the material covered since the previous exam. For example, the second exam will emphasize chapters 6 through 9, but will also include questions related to chapters 1 through 5.

Exams may include questions of fill-in-the-blank, matching, and multiple-choice formats, and may require computations like those made in class and on problem sets. Exams may also include a question or two (or three) that requires short written answers (several well-composed sentences, plus diagrams). Students are required to show their work for all computations on exams.

Make-up exams will be provided in only the most adverse circumstances (e.g. serious illness). Documentation of the circumstance (e.g. doctor's note) may be required.

Arrangements for a make-up exam must be made with the instructor prior to the scheduled time of the regular exam.

In the event that a student is provided with a make-up exam, he or she should anticipate that it will likely be different from the regular exam.

BLACKBOARD

Some aspects of this course are available through UTC's online course delivery system (Blackboard), which can be accessed at:

<http://utconline.utc.edu>

Your user name for logging on to the system is your UTCID (mix of letters and numbers). Your password for Blackboard is the same as your password for your UTC e-mail (Onenet) and for your access to the Lupton Library databases. If you change your password in Blackboard, you also change your password on both of these other systems. If you forget your password, follow the "Forgot Password" links from either the Onenet (<http://onenet.utc.edu/>) or Blackboard (<http://bb2.utc.edu/webapps/login>) login pages.

Documentation on student use of Blackboard is available at:

<http://utconline.utc.edu/BB6Students.html>

EMAIL (firstname-lastname@utc.edu)

To enhance student services, the University will use your UTC email address (firstname-lastname@utc.edu) for communications. (See <http://onenet.utc.edu> for your exact address.) Please check your UTC email on a regular basis. If you have problems with accessing your email account, contact the Help Desk at 423-425-2676.

OTHER POLICIES

Students are expected to attend class regularly. Attendance and participation will be considered in the final grade. (See *Grades* .)

Students are expected to be punctual, attentive and prepared for class.

Students that arrive late for an exam may not be permitted to take the exam.

Assignments are expected to be turned in on time. Late assignments will be accepted in only the most adverse circumstances (e.g. serious illness or accident). Documentation of the circumstance (e.g. doctor's note) may be required.

All students are expected to follow the UTC honor code.

ATTENTION: If you are a student with a disability and think that you might need special assistance or special accommodation(s) in this class or any other class, call the Office for Students with Disabilities / College Access Program at 425-4006 or come by the office, 110 Frist Hall.

This syllabus is subject to minor changes.