GEOLOGY 404C (#27355-27380)

PLATE TECTONICS AND EARTH HISTORY

INSTRUCTOR - Dr. James Sprinkle
Office - JGB 4.106
Lecture – JGB 2.218
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Office Hours - Tu, Th 12:30-1 PM; F 12-1 PM, M, W 1-2 PM; other times by appointment

TAs – Felicia Kulp <felicia.kulp@gmail.com> and Zhi-Heng Li <liziheng1982@hotmail.com>
Office hours in Lab Room JGB 3.116; hours to be selected

PREREQUISITES - A grade of C or better in GEO 401 or 303 or 312K or the equivalent.

COURSE TOPICS - The geologic time scale, new 2012 version (1st lecture)
- Structure and composition of the earth (2 lectures)
- Plate tectonics and its implications to earth history (5 lectures)
- Sedimentary rocks and depositional environments (5 lectures)
- Setting up and measuring “deep” geologic time (4 lectures)
- Fossils, history of life, and evolution (3 lectures)
- History of the Southern African & North American continents (7 lectures)
- Origin and evolution of invertebrates, plants, and vertebrates (9 lectures)
- Human evolution and place in nature (2 lecture)

Lecture Outlines (plus Syllabus, Lecture Schedule, and other information) will be posted on the GEO 404C Blackboard site: <https://courses.utexas.edu/webapps/portal/frameset.jsp>


COURSE READING - Other reading assignments are in the Geology Library (4th floor) either on reserve (books), or in my file cabinet drawer (separates) at the back of the Reading Room.

EXAMS AND COURSE GRADES - Grades will be determined in the following manner:

Lecture - 2-week Friday quizzes (6 total, count top 5) - 15%
- 1st Hour Exam - Friday, Feb. 15th - 15%
- 2nd Hour Exam - Friday, Mar. 29th - 15%
- Final Exam – Fri., May 10th, 2-5 PM, 2 hrs. - 30%

Discussion Section - Exams, exercises, and participation - 25%
Total - 100%

Lecture quizzes, exams, and the final may include any of the following types of questions: true-false, multiple choice, matching, complete-the-answer, lists, definitions, problems, drawings or charts, and short to intermediate-length essays. All exams are closed-book and are usually intermediate in difficulty. Hour exams and the final are cumulative, covering all previous work up to the time of that exam; quizzes will cover the previous 2-weeks' work (usually 5-6 lectures). Marks will be carried
through as numbers, added up at the end of the course, and then curved to get a final grade. Last spring's average mark for this course was a 66.7 (top mark 91.8, lowest complete mark 45.8), and there were 9 As, 34 Bs, 23 Cs, 7 Ds, 6 Fs, 3 Xs, 2 Qs, & 1W in a fairly large class of 85, giving an overall class GPA of 2.33. Some plus and minus grades will be given to students near a major grade boundary.

ACADEMIC POLICIES - *No special policy* on drops, incompletes, or time extensions; see General Information Catalog, Part V. A make-up exam for a missed hour exam may be given at the instructor's discretion up to the time of the next lecture period (usually a Monday) when the corrected exams are returned. Last day to drop this course without academic penalty is *Wednesday, Jan. 30th*; last day to drop this course or withdraw (need Dean's approval) is *Monday, April 1st*.

STUDENTS WITH DISABILITIES may request appropriate academic accommodations from the Division of Diversity and Community Engagement, Services for Students with Disabilities, 471-6259 or [http://www.utexas.edu/diversity/ddce/ssi/](http://www.utexas.edu/diversity/ddce/ssi/)

ACCOMMODATIONS FOR RELIGIOUS HOLIDAYS – By UT Austin policy, a student must notify the instructor of a pending absence from class at least fourteen days prior to the date of observance of a religious holy day. If you must miss a class, an examination, a lab assignment, or a project in order to observe a religious holy day, you will be given an opportunity to complete the missing work within a reasonable time after the absence.
GEOLOGY 404C - PLATE TECTONICS AND EARTH HISTORY

LECTURE SCHEDULE AND READING - SPRING, 2013

Mon., Jan. 14 - Introduction + the new 2012 geologic time scale
Memorize time scale handout
Bjornerud, p. 53-63
McCarthy & Rubidge, p. 71

Wed., Jan. 16 - The Earth's interior plus continents and oceans
Prothero & Dott, 2010, p. 104-116
McCarthy & Rubidge, p. 28-32, p. 51

Fri., Jan. 18 - Geosynclines and mountain belts
McCarthy & Rubidge, p. 25-27

Mon., Jan. 21 - Holiday – No Lecture & Go to another Tues.-Wed.-Thurs. Lab this week

Wed., Jan. 23 - Continental drift and the plate tectonics "revolution"
Stanley, p. 129-141
Prothero & Dott, 2010, p. 319-330

*Fri., Jan. 25 - 1st QUIZ + Plates, plate boundaries, & plate movement
Dietz, Sci. Amer. #899 (Wilson book)
McCarthy & Rubidge, p. 22-25, p. 32-50, p. 52-57

Mon., Jan. 28 - Plate tectonics and Phanerozoic Earth history
Dietz & Holden, Sci. Amer. #892 (Wilson book)
Bambach et al., p. 86-98 (Skinner book)

Wed., Jan. 30 - Plates, terranes, and the history of life
Jones et al., p. 70-84
Hallam, Sci. Amer. #903 (Wilson book)

Fri., Feb. 1 - Precambrian plates and supercontinent cycles
Prothero & Dott, 2010, p. 155-158
Kerr, 1989, p. 529-530
Kerr, 1997, p. 613-615
Rogers and Santosh, 2002, p. 5-19
McCarthy & Rubidge, p. 148-162, p. 186-195, p. 244-251

Mon., Feb. 4 - Sediments and sedimentary environments
Eicher, p. 20-32
McCarthy & Rubidge, p. 64-65, 72-73, 82, 98-100, 162-163

Wed., Feb. 6 - Sedimentary structures and diagenesis
Eicher, p. 32-35
Newton & Laporte, p. 21-26
McCarthy & Rubidge, p. 86-87

*Fri., Feb. 8 - 2nd QUIZ + Sedimentary facies
Prothero & Dott, 2010, p. 75-80

Mon., Feb. 11 - Unconformites
Eicher, p. 45-51
Prothero & Dott, p. 82-83
Wed., Feb. 13 - Geologic maps and cross sections
       Eicher, p. 35-41
       Prothero & Dott, 2010, p. 20-24
       McCarthy & Rubidge, p. 77

*Fri., Feb. 15 - 1st HOUR EXAM (15%)

Mon., Feb. 18 - Discuss corrected exams and catch up

Wed., Feb. 20 - Relative age dating
       Stokes, p. 72-82

Fri., Feb. 22 - History of the geologic time scale
       Prothero & Dott, 2010, p. 24-32, p. 71-75
       McCarthy & Rubidge, p. 71

Mon., Feb. 25 - Geologic clocks and absolute age dating I
       Prothero & Dott, 2010, p. 90-94
       McCarthy & Rubidge, p. 68-69

Wed., Feb. 27 - Absolute age dating II
       Prothero & Dott, 2010, p. 94-100

*Fri., Mar. 1 - 3rd QUIZ + Fossils: preservation, usefulness, and classification
       Ausich & Lane, p. 19-20, p. 33-47
       McCarthy & Rubidge, p. 204

Mon., Mar. 4 - Darwin and evolutionary theory

Wed., Mar. 6 - Patterns from the fossil record
       Freeman & Herron, 2001, p. 521-536

Fri., Mar. 8 - Origin of the Earth's crust, oceans, and atmosphere
       Prothero & Dott, 2010, p. 116-121
       Hammond, p. 245
       Tyson, 1999, p. 92-95
       McCarthy & Rubidge, p. 61-63, p. 66-70, p. 74-75

SPRING VACATION

Mon., Mar. 18 - Precambrian orogenic & cratonic history of N. America & southern Africa
       McCarthy & Rubidge, p. 60, 75-76, 78-81, 83-85, 89-91, 94-99, 101-112, 118, 121-145,

Wed., Mar. 20 - Phanerozoic orogenic history of North America

*Fri., Mar. 22 - 4th QUIZ + Phanerozoic cratonic history of North America

Mon., Mar. 25 - Coal and cyclothems
       McCarthy & Rubidge, p. 199-202

Wed., Mar. 27 - Evaporites, salt domes, coastal plains, fault basins
       Martinez, 1991, p. 420-431
*Fri., Mar. 29* - 2nd HOUR EXAM (15%)

**Mon., Apr. 1** - Discuss corrected exams and catch up

**Wed., Apr. 3** - Pleistocene glaciation and Greenhouse-Icehouse cycles

Prothero & Dott, 2010, p. 462-480
Broecker and Denton, p. 49-56

**Fri., Apr. 5** - Origin and Precambrian evolution of life

Cowen, 2004, p. 6-14, p. 22-36, p. 42-46

**Mon., Apr. 8** - Precambrian-Cambrian boundary & origin of metazoans

Prothero & Dott, 2010, p. 185-201
Freeman & Herron, 2001, p. 511, p. 516-520
McCarthy & Rubidge, p. 176-183

**Wed., Apr. 10** - Patterns of invertebrate evolution


*Fri., Apr. 12* - 5th QUIZ + Extinctions and "living fossils"

Newell, Sci. Amer. #867 (Laporte book)
Stokes, p. 500-511
McCarthy & Rubidge, p. 298-300

**Mon., Apr. 15** - Evolution of higher plants and origin of vertebrates

McAlester, p. 89-107
Bone, p. 1-16
McCarthy & Rubidge, p. 216-222

**Wed., Apr. 17** - Fish evolution

McAlester, p. 78-85

**Fri., Apr. 19** - Amphibians and early reptiles

McAlester, p. 85-88, p. 108-117
McCarthy & Rubidge, p. 223-234

**Mon., Apr. 22** - Dinosaurs vs. early mammals

McAlester, p. 117-131
McCarthy & Rubidge, p. 234-239

**Wed., Apr. 24** - Cenozoic mammals and birds

Prothero & Dott, 2010, p. 444-457
McCarthy & Rubidge, p. 240-241, p. 277

*Fri., Apr. 26* - 6th QUIZ + Evolution of humans and Pleistocene mammal extinctions

McAlester, p. 137-154
Prothero & Dott, 2010, p. 484-491
McCarthy & Rubidge, p. 276, p. 277-295

**Mon., Apr. 29** - Resources & the environment

Prothero & Dott, 2010, p. 500-517
Kerr, 1998, p. 1128-1131
McCarthy & Rubidge, p. 309-317

**Wed., May 1** - Should you become a geology major? + Course evaluation

**Fri., May 3** - Review for Final Exam on Fri., May 10th (30%)