

## GEOLOGY 404C (#27355-27380)

### PLATE TECTONICS AND EARTH HISTORY

INSTRUCTOR - Dr. James Sprinkle                      Office - JGB 4.106                      Lecture – JGB 2.218  
Mailbox in EPS 1.130A; office phone 471-4264; e-mail - echino@jsg.utexas.edu  
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 <lizhiheng1982@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 (1<sup>st</sup> 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.js>>

TEXTBOOKS - D. R. Prothero and R. H. Dott, Jr. (2010), *Evolution of the Earth* (8<sup>th</sup> ed.), McGraw-Hill (Paper), and T. McCarthy and B. Rubidge (2005), *The Story of Earth & Life*, Struik Publishers (Paper). Both books are on reserve in the Geology Library (4th floor).

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:

<u>Lecture</u> - 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%

<u>Discussion Section</u> - 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/ssd/>

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  
Prothero & Dott, 2010, p. 126-133, p. 243-250  
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  
Dalziel, 1995, p. 58-63 (Jan. Sci. Amer.)  
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 - Unconformities  
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  
Prothero & Dott, 2010, p. 42-52, p. 55-65, p. 236-238
- 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  
Prothero & Dott, 2010, p. 151-155, p. 164-175  
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  
Prothero & Dott, 2010, p. 250-254, p. 287-293, p. 313-318, p. 350-353,  
p. 359-374, p. 412-430
- \*Fri., Mar. 22 - 4th QUIZ + Phanerozoic cratonic history of North America  
Prothero & Dott, 2010, p. 206-217, p. 269-280, p. 282-287, p. 298-302,  
p. 353-359, p. 374-376, p. 438-440
- Mon., Mar. 25 - Coal and cyclothem  
Prothero & Dott, 2010, p. 302-308, p. 334-338, p. 412-414  
McCarthy & Rubidge, p. 199-202
- Wed., Mar. 27 - Evaporites, salt domes, coastal plains, fault basins  
Prothero & Dott, 2010, p. 277-281, p. 438-440  
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  
McCarthy & Rubidge, p. 119, p. 195-199, p. 270-273
- Fri., Apr. 5 - Origin and Precambrian evolution of life  
Cowen, 2004, p. 6-14, p. 22-36, p. 42-46  
McCarthy & Rubidge, p. 112, p. 114-116, p. 166-176
- 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  
Stokes, p. 278-285, p. 309-314, p. 348-353, p. 388-390
- \*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  
Padian & Chiappe, 1998, p. 38-47  
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%)