

GEOLOGY 404C (#27405-27430)

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@mail.utexas.edu
Office Hours - Tu, Th 12-12:30 PM; F 12-1 PM, M, W 1-2 PM; other times by appointment

TAs – Ashley Latimer <latimer.ae@gmail.com> and Zhi-Heng Li <lizhiheng1982@hotmail.com>;
Office hours in Lab Room JGB 3.202; 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 2004 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 (6 lectures)
- Origin and evolution of invertebrates, plants, and vertebrates (8 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>>

TEXTBOOKS - D. R. Prothero and R. H. Dott, Jr. (2010, 2004), *Evolution of the Earth* (8th, 7th 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. 17th	- 15%
- 2nd Hour Exam - Friday, Mar. 30th	- 15%
- Final Exam - Mon., May 14th, 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 4-6 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 68.6 (top mark 91.2, lowest mark 37.3), and there were 12 A's, 37 B's, 28 C's, 7 D's, 1 F, 2 X's, and 1 Q, in a fairly large class of 88, giving a overall class GPA of 2.52. 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 Monday, Feb. 13th; last day to drop this course or withdraw (need Dean's approval) is Monday, March 26th.

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, 2012

- Wed., Jan. 18 - Introduction + the new 2004 geologic time scale
Memorize time scale handout
Bjornerud, p. 53-63
McCarthy & Rubidge, p. 71
- Fri., Jan. 20 - The Earth's interior plus continents and oceans
Prothero & Dott, 2010, p. 104-116
McCarthy & Rubidge, p. 28-32, p. 51
- Mon., Jan. 23 - Geosynclines and mountain belts
Prothero & Dott, 2010, p. 126-133, p. 243-250
McCarthy & Rubidge, p. 25-27
- Wed., Jan. 25 - Continental drift and the plate tectonics "revolution"
Stanley, p. 129-141
Prothero & Dott, 2010, p. 319-330
- Fri., Jan. 27 - No Lecture?
Study for 1st Quiz
- *Mon., Jan. 30 - 1st QUIZ + Plates, plate boundaries, & plate movement
Dietz, Sci. Amer. #899 (Wilson book)
McCarthy & Rubidge, p. 22-25, p. 32-50, p. 52-57
- Wed., Feb. 1 - Plate tectonics and Phanerozoic Earth history
Dietz & Holden, Sci. Amer. #892 (Wilson book)
Bambach et. al., p. 86-98 (Skinner book)
- Fri., Feb. 3 - 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)
- Mon., Feb. 6 - 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
- Wed., Feb. 8 - Sediments and sedimentary environments
Eicher, p. 20-32
McCarthy & Rubidge, p. 64-65, 72-73, 82, 98-100, 162-163
- *Fri., Feb. 10 - 2nd QUIZ + Sedimentary structures and diagenesis
Eicher, p. 32-35
Newton & Laporte, p. 21-26
McCarthy & Rubidge, p. 86-87
- Mon., Feb. 13 - Sedimentary facies
Prothero & Dott, 2010, p. 75-80
- Wed., Feb. 15 - Unconformities
Eicher, p. 45-51
Prothero & Dott, p. 82-83
- *Fri., Feb. 17 - 1st HOUR EXAM (15%)

- Mon., Feb. 20 - Discuss corrected exams and catch up
- Wed., Feb. 22 - Geologic maps and cross sections
Eicher, p. 35-41
Prothero & Dott, 2010, p. 20-24
McCarthy & Rubidge, p. 77
- Fri., Feb. 24 - Relative age dating
Stokes, p. 72-82
- Mon., Feb. 27 - History of the geologic time scale
Prothero & Dott, 2010, p. 24-32, p. 71-75
McCarthy & Rubidge, p. 71
- Wed., Feb. 29 - Geologic clocks and absolute age dating I
Prothero & Dott, p. 90-94
McCarthy & Rubidge, p. 68-69
- *Fri., Mar. 2 - 3rd QUIZ + Absolute age dating II
Prothero & Dott, 2010, p. 94-100
- Mon., Mar. 5 - Fossils - preservation, usefulness, and classification
Ausich & Lane, p. 19-20, p. 33-47
McCarthy & Rubidge, p. 204
- Wed., Mar. 7 - Darwin and evolutionary theory
Prothero & Dott, 2010, p. 42-52, p. 55-65, p. 236-238
- Fri., Mar. 9 - Patterns from the fossil record
Freeman & Herron, 2001, p. 521-536

SPRING VACATION

- Mon., Mar. 19 - 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
- Wed., Mar. 21 - 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,
- *Fri., Mar. 23 - 4th QUIZ + 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
- Mon., Mar. 26 - 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
- Wed., Mar. 28 - Coal and cyclothem
Prothero & Dott, 2010, p. 302-308, p. 334-338, p. 412-414
McCarthy & Rubidge, p. 199-202
- *Fri., Mar. 30 - 2nd HOUR EXAM (15%)
- Mon., Apr. 2 - Discuss corrected exams and catch up

- Wed., Apr. 4 - Evaporites, salt domes, coastal plains, fault basins
Prothero & Dott, 2010, p. 277-281, p. 438-440
Martinez, 1991, p. 420-431
- Fri., Apr. 6 - 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
- Mon., Apr. 9 - 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
- Wed., Apr. 11 - 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
- *Fri., Apr. 13 - 5th QUIZ + Patterns of invertebrate evolution
Stokes, p. 278-285, p. 309-314, p. 348-353, p. 388-390
- Mon., Apr. 16 - Extinctions and "living fossils"
Newell, Sci. Amer. #867 (Laporte book)
Stokes, p. 500-511
McCarthy & Rubidge, p. 298-300
- Wed., Apr. 18 - Evolution of higher plants and origin of vertebrates
McAlester, p. 89-107
Bone, p. 1-16
McCarthy & Rubidge, p. 216-222
- Fri., Apr. 20 - Fish evolution
McAlester, p. 78-85
- Mon., Apr. 23 - Amphibians and early reptiles
McAlester, p. 85-88, p. 108-117
McCarthy & Rubidge, p. 223-234
- Wed., Apr. 25 - Dinosaurs vs. early mammals
McAlester, p. 117-131
McCarthy & Rubidge, p. 234-239
- *Fri., Apr. 27 - 6th QUIZ + Cenozoic mammals and birds
Prothero & Dott, 2010, p. 444-457
Padian & Chiappe, 1998, p. 38-47
McCarthy & Rubidge, p. 240-241, p. 277
- Mon., Apr. 30 - Evolution of humans and Pleistocene mammal extinctions
McAlester, p. 137-154
Prothero & Dott, 2010, p. 484-491
McCarthy & Rubidge, p. 276, p. 277-295
- Wed., May 2 - Resources & the environment, + Should you become a geology major?
Prothero & Dott, 2010, p. 500-517
Kerr, 1998, p. 1128-1131
McCarthy & Rubidge, p. 309-317
- Fri., May 4 - Review for Final Exam on Mon., May 14th (30%) + Course evaluation