

# **SYLLABUS**

## **Geology 230 – Seminar**

### **Geology and Tectonic Development of California**

**Instructor:** Dr. Diane Carlson (carlsondh@csus.edu)  
**Office:** Placer Hall 1015

**Office Phone:** 278-6382  
**Office Hours:** W 10 –11:30 a.m.  
Th 3:30 – 4:30 p.m.

### **Course Content and Objectives**

In this seminar course we will read, discuss, analyze, and critique selected papers from the scientific literature on the geology and tectonic development of California. In so doing, you are expected to not only improve your understanding of California geology, but also:

- Improve your reading of complex scientific papers,
- Improve your ability to analyze the scientific literature,
- Articulate the essence of scientific papers,
- Write discussion questions, summaries and critiques of scientific papers, and
- Synthesize several scientific papers to draw new conclusions or inferences.

### **Co-requisite / Prerequisite**

Geology 200; undergraduate course in structural geology.

### **Required Text / Readings:**

*California Geology* by Deborah Hardin (available in the Bookstore), and...

Selected papers from the current and historic literature on the geology and tectonics of California. Papers will be available for you to photocopy by the second class.

### **Grading:**

#### **Participation- 25%**

It will be essential that you come to class prepared having read the assigned papers and completed assignments related to the reading. You will be graded each week on your participation in the discussion of the readings.

#### **Oral Summaries and Discussion- 25%**

You will be assigned selected papers/chapters to summarize and lead discussions. The quality of the discussions will depend, in large part, on how prepared you are and on the discussion questions you write.

#### **Written Work- 25%**

You will be required to write and answer discussion questions for the readings, write summaries of chapters in the text and other readings, and write critiques of some of the papers we read for class.

### **Projects- 25%**

In addition to papers selected by the instructor, you will conduct your own literature search and reading related to some aspect of California geology. The goal of this literature research is to synthesize data and conclusions from several papers in order to draw broader conclusions and inferences than presented in any one paper. The results of the individualized literature research will be presented orally to the entire class the last three weeks of the semester and in a written report due on the last day of class. Ideally, the topic should relate to your thesis research and provide the background and text for the Regional Geology section of your thesis.

The oral presentation should be about 20 minutes long with 10 minutes for discussion and questions. Please have a copy of the pertinent background readings available for the class the week before your presentation along with an outline of your talk.

### **Attendance:**

Because of the seminar format, it will be very difficult to make up material if you miss class. If you must miss class, you will not receive points for participation or any assignments due that day. If you have a good excuse, or are verifiably ill, let me know well before class.

### **Field Trip:**

There will be a joint field trip with Geology 200 on Saturday, March 29 to view structures in the Coast Ranges west of Sacramento. We will need to carpool with private vehicles and share expenses. Please let me know if you can drive and how many people you can take. You will be given time off from class to compensate for the field trip.

## **Geology 230 – Seminar Geology and Tectonic Development of California**

### **SCHEDULE**

<b>Week</b>	<b>Topic</b>
1	Introduction; Objectives; Seminar Format; California Geology
2	Summarize and Discuss Chpts. 5 – 11 in <i>California Geology</i> text
3	<b>Week off</b>
4	Summarize and Discuss Chpts. 12 – 19 in <i>California Geology</i> text
5	Sierra Nevada Foothills and Klamath papers
6	Sacramento and San Joaquin Valley papers

- 7                    Neotectonics chapters; Coast Range papers
- 8                    Coast Ranges and San Francisco Bay area papers
- 9                    LA Basin/Transverse Ranges papers; **FIELD TRIP**
- 10                  Sierra Nevada uplift; Neotectonics of Lake Tahoe
- 11                  Mojave Desert/Death Valley/Basin and Range papers
- 12                  EASTER BREAK**
- 13                  Synthesis of papers; catch-up time
- 14                  Student presentations
- 15                  Student presentations
- 16                  Student presentations; PAPER DUE**

## **SEMINAR PAPERS WE WILL BE READING AND DISCUSSING:**

### **Sierra Nevada Foothills and Klamath Papers --- Week 5**

Day, H.W., 1992, Tectonic setting and metamorphism of the Sierra Nevada, California; *in* Field Guide to the Geology and Metamorphism of the Franciscan Complex and Western Metamorphic Belt of Northern California, CDMG Special Publ. 114, p. 12 – 28.

Graymeyer, R. W. and Jones, D.L., 1994, Tectonic implications of radiolarian cherts From the Placerville Belt, Sierra Nevada Foothills, California: Nevadan-age Continental growth by accretion of multiple terranes; Geol Soc America Bull, v. 106, p. 531-540.

Hacker, B. and others, 1995, Timescales of orogeny; Jurassic construction of the Klamath Mountains; Tectonics, v. 14, no. 3, p. 677-703.

### **Sacramento and San Joaquin Valley Papers --- Week 6**

Bartow, J. A., Cenozoic stratigraphy of the northern San Joaquin Valley, central California, p. 5 – 12.

<sup>1/2</sup>Davis, T. L. and Lagoe, M. B., 1988, A structural interpretation of major tectonic events Affecting the western and southern margins of the San Joaquin Valley,

California; *in* Studies of the Geology of the San Joaquin Basin, Pacific Section SEPM, v.60, p. 65 – 87.

<sup>1/2</sup>Harwood, D. S. and Helley, E. J., 1987, Late Cenozoic tectonism of the Sacramento Valley, California; U. S. Geol. Survey Prof. Paper 1359, 45 p.

Shlemon, R. J., 1998, Quaternary geology of the Sacramento Area; Assoc. Eng. Geol Field Trip Guidebook. (selected articles).

### **Neotectonics Chapters and Coast Range Papers --- Week 7**

Keller, E.A. and Pinter, N., 2002, Chpt. 2 – Landforms, tectonic geomorphology, and Quaternary chronology. AND Chpt. 7 – Active folding and earthquakes; *in Active Tectonics- Earthquakes, Uplift, and Landscape*. **{background reading}**

Unruh, J. R., Loewen, B.A., and Moores, E.M, 1995, Progressive arcward contraction of a Mesozoic-Tertiary fore-arc basin, southwestern Sacramento Valley, California; Geol Soc America Bull, v. 107, n. 1, p. 38-53.

<sup>1</sup>Unruh, J. R., Davisson, M.L, Criss, R.E, and Moores, E.M., 1992, Implications of Perennial saline springs for abnormally high fluid pressures and active thrusting in western California; Geology, v. 20, p. 431– 434.

<sup>1</sup>Ramirez, V. R., 1992, Geology and deep structure of the Rumsey Hills area, Sacramento Valley, California; *in* Erskin, M.C., Unruh, J., Lettis, W.R., Bartow, J.A. eds. Field Guide to the Tectonics of the Boundary Between the California Coast Ranges and the Great Valley of California.

### **Coast Ranges and San Francisco Bay Area Papers --- Week 8**

Sedlock, R. L., 1995, Tectonic framework, origin, and evolution of the San Francisco Bay region; *in* Sangines, E.M., Anderson, D.W., and Busing, A.B., eds. Recent Geologic Studies in the San Francisco Bay Area: Pacific section, SEPM, v. 76, p. 1-18.

Argus, D.F. and Gordon, R.G., 2001, Present tectonic motion across the Coast Ranges And San Andreas fault system in central California; Geol. Soc. America Bull, v. 113, n. 12, p 1580-1592.

Graymer, R. W, and others, 2002, Controls on timing and amount of right-lateral offset on the East Bay fault system, San Francisco Bay region, California; Geol Soc. America Bull., v. 114, n. 12, p. 1471-1479.

Unruh, J. and others, 1992, Tectonic wedging and Late Cenozoic evolution of the eastern Diablo Range mountain front, northwestern San Joaquin Valley, California; *in*

Erskin, M.C., Unruh, J., Lettis, W.R., Bartow, J.A. eds. Field Guide to the Tectonics of the Boundary Between the California Coast Ranges and the Great Valley of California, p. 13- 21.

### **LA Basin/Transverse Ranges Papers --- Week 9**

Tsutsumi, H., Yeats, R., and Huftile, G.J., 2001, Late Cenozoic tectonics of the northern Los Angeles fault system, California; Geol. Soc. America Bull., v. 113, n. 4, p. 454-468.

<sup>1</sup>Ingersoll, R.V. and Rumelhart, P.E., 1999, Three-stage evolution of the Los Angeles Basin, southern California; v. 27, n. 7, p. 593-596.

<sup>1</sup>Pinter, N. and others, 2001, Fault-related folding in California's northern Channel Islands Documented by rapid-static GPS positioning; Geol. Soc America Today, p. 4-9.

<sup>2</sup>Sorlien, C.C., Kamerling, M.J. and Drew, M., 1999, Block rotation and termination of The Hosgri strike-slip fault, California, from three-dimensional map restoration; Geology, v. 27, n. 11, p. 1039-1042.

<sup>2</sup>Bjorklund, T. and others, 2002, Miocene rifting in the Los Angeles basin: Evidence from The Puente Hills half-graben, volcanic rocks, and P-wave tomography; Geology, v. 30, n. 5, p. 451-454.

<sup>2</sup>Azor, A., Keller, E.A., and Yeats, R.S., 2002, Geomorphic indicators of active fold growth: South Mountain-Oak Ridge anticline, Ventura basin, southern California; Geol. Soc. America Bull., v. 114, n. 6, p. 745-753.

### **Sierra Nevada Uplift; Neotectonics of Lake Tahoe Papers --Week 10**

Unruh, J.R., 1991, The uplift of the Sierra Nevada and implications for Late Cenozoic epeirogeny in the western Cordillera; Geol. Soc. America Bull., v. 103, n. 12, p. 1395-1404.

<sup>1/2</sup>Wakabayashi, J. and Sawyer, T.L., 2001, Stream incision, tectonics, uplift, and evolution of topography of the Sierra Nevada, California; The Jour. of Geol., v. 109, p. 539 – 562.

Schweickert, R.A. and others, 2000, Lake Tahoe faults, landslides, and tsunamis; *in* Lageson, D.R., Peters, S.G. and Lahren, M.M., eds. Great Basin and Sierra Nevada; Geol. Soc. America Field Guide 2, p. 1-22.

## **Mojave Desert/ Death Valley/Basin and Range Papers --- Week 11**

- <sup>1</sup>Peltzer, G., Crampe, F., Hensley, S., and Rosen, P., 2001, Transient strain accumulation and fault interaction in the Eastern California shear zone; *Geology*, v. 29, n. 11, p. 975-978.
- <sup>1</sup>Freed, A.M. and Lin, J., 2002, Accelerated stress buildup on the southern San Andreas Fault and surrounding regions caused by Mojave Desert earthquakes; *Geology*, v. 30, n. 6, p. 571-574.
- <sup>2</sup>Fuis, G.S. and others, 2001, Crustal structure and tectonics from the Los Angeles basin to the Mojave Desert, southern California; v. 29, n. 1, p. 15-18.
- <sup>2</sup>Bawden, G.W., Michael, A.J., and Kellogg, L.H, 1999, Birth of a fault: Connecting the Kern County and Walker Pass, California earthquakes; v. 27, n. 7, p. 601-604.
- Lee, J., Rubin, C.M., and Calvert, A., 2001, Quaternary faulting history along the Deep Springs fault, California; *Geol Soc. America Bulletin*