**Quaternary Geochronology** GEOL595L Syllabus, Fall 2011(subject to change)

Meeting time: Tuesday/Thursday 12:30-1:45 PM, Live Oak Room 1205

Prof. Richard Heermance

-Office LO1212, email: [richard.heermance@csun.edu](mailto:richard.heermance@csun.edu), phone 677-4357

-office hours: Wed 9:30-11:30 AM or by appointment

-class webpage: “moodle” page at moodle.csun.edu

## **COURSE OBJECTIVES**

1) Define the Quaternary Period. How is it different from other periods of geologic time. What do we know about climate and geologic events during this time period.

2) Understand some of the geochronologic techniques used study Quaternary Geology, including 14C dating, cosmogenic isotope exposure dating, U-series disequilibrium and luminescence methods.

3) Learn how to map Quaternary geology (ie., terraces, moraines, soil chronosequences, etc.)

Lecture and problem-sets will be combined with field and laboratory exercises and literature reviews.

**TEXTS AND MATERIALS**

No specific textbook is required for this course, although the out-of-print book Quaternary Geology for Scientists and Engineers (1988) by J. Catt is highly recommended. Course readings will be taken from a variety of sources, and pdf’s will be posted in moodle. I will continually update the bibliography within moodle as well.

**CLASS PARTICIPATION**

You will get out of this class what you put into it. Please try to keep up with the readings as much as possible. I will give pop-quizzes related to lectures and readings. Feel free to ask questions at any time during the course.

**CLASS RULES**

1. Turn OFF all cell-phones and other electronic equipment while in-class. This means NO TEXTING, TALKING, EMAILING, ETC IN CLASS! I will confiscate any equipment used for personal use during class time.
2. Group work and discussion is encouraged. All written assignments and exams, however, must be done entirely by each student unless otherwise instructed.
3. Honor code violations will result in automatic NO CREDIT

**GRADING**

15% Midterm

25% Final (cumulative)

20% Problem Sets

20% Field Trip Project/presentation

20% Quality class participation, including paper presentations

quizzes, and discussion.

Grades will be based on a class curve. At a minimum, the following percentages will correspond to each grade, although the cutoff percentage could decrease depending on the curve.

93-100 % A

90-93 % A-

88-90% B+

82-88% B

80-82% B-

78-80% C+

72-78% C

70-72% C-

67-70% D+

63-67% D

60-63% D-

<60% F

Grades of Incomplete are extremely rare and can only if be given if the student meets ALL the requirements set forth in University policy for Incompletes, including 1) has a passing grade in the work completed, 2) has completed a substantial portion of the work in the course, and 3) is able to complete the remaining work independently, with minimal assistance from the instructor. An Incomplete shall not be assigned when a student would be required to attend a major portion of the class when it is next offered.

**QUATERNARY GEOCHRONOLOGY WORK DESCRIPTION**

**TRINITY ALPS FIELD TRIP:** Much of the class will focus around the REQUIRED field trip to the Trinity Alps, CA from Sep 22-26. We will leave at 8 AM on Thursday and return Monday evening, Sep 26. On the field trip we will review many Quaternary landforms, and you will have 2 days to complete a field project mapping, describing, and interpreting the geologic history near Big Flat in the Trinity Alps. I will provide more information as the time approaches.

**FIELD TRIP PRESENTATION**

You will present in pairs (or individually, depending on the project) your preliminary results from your project in the Trinity Alps. These presentations should be done in powerpoint and include pertinent background information, maps, and interpretations from your study.

**PROBLEM SETS**

During the semester, you will have 2 problem sets to complete. The due dates are shown on the syllabus, and problem sets are due at the BEGINNING of class on the due date. NO LATE WORK ACCEPTED!

You can work on these individually or together, but please turn in your own work. These problem sets will require you to interpret real data to determine an age, and will pull together information from multiple sources (journals, textbook chapters, lecture) that we cover in class.

**PAPER PRESENTATIONS**

Throughout the class, we will review, discuss, and present studies from scientific literature. Each paper will have one “lead presenter” and one “backup.” The lead presenter will make a 1-page handout (8-copies) that summarizes the main points of the paper, as well as provide overheads of the main figures, and prepare an ~10 minute presentation of the paper. In addition, a second student will be “back-up” on the presentation, and will be required to answer supplementary questions about the paper or assist the lead presenter during class discussion. Make sure you can do the following for your presentation:

1) Summarize the contents of the paper and provide a <1 page handout for the rest of the class.

2) What are the underlying assumptions of each paper. If the paper cites other important references, you may want to examine those as well to give us (the audience) an idea about the paper background.

3) Critically evaluate the paper---are the conclusions believable or are there any interpretations that were not considered.

4) Be able to reproduce calculations presented in the text and tables. Also, make sure you pull up any supplementary data that may be archived in a data repository so the class may view it.

**FINAL EXAM**

There will be an open-book, take-home final exam. You will be given 27 hours to complete the exam. You can pick up y our final on Wednesday, Dec 14 at noon and must return it to me by Thursday, Dec 15 by 3 PM. These exams must be done individually.

**Some pointers for reading a scientific paper**

* *Read introduction and conclusions first. Don’t try to read the whole thing in one sitting. Read part, let it rest, and then go back to the paper to complete it.*
* *Make special note of who the authors are. What are their qualifications? What are potential conflicts of interest? (I’d be very wary of a paper on evolution if it came out of the Institute for Creation Research; likewise for a paper on climate change coming from an oil company.)*
* *Make special note of when the paper was published, and in what journal it was published. Has the paper been subject to peer-review? (You can assume all mainstream journals, such as those you find on the UCSB e-journals website, are peer-reviewed.)*
* *Pay close attention to the figures and tables and their captions.*
* *Don’t get bogged down in the details. Don’t give up if you don’t understand the Materials and Methods Section or you fall asleep during the Results Section! As with the novel Moby Dick, it’s often better to read different parts of a paper at different paces.*
* *Don’t shut down when you come across math. Read through the equation slowly; what’s the relationship between different variables? Often it’s easier than you think!*
* *If you’re new to a subject, the jargon may get to be too much. Keep a dictionary (preferably a geology dictionary) or Google on hand. Usually Wikipedia.org comes through in a pinch.*
* *Be an active reader, not a passive one. This means you should:*

***Ask yourself big-picture questions:***

* + - *What’s the main point of this paper?*
    - *How do the authors prove – or try to prove -- their point?*
    - *What is the hypothesis they want to test?*
    - *What are the results?*
    - *How do the authors interpret these results?*
    - *What are the implications of these interpretations?*
    - *What are the potential weaknesses of this paper? (The answer, by the way, is hardly ever ‘none’. And you don’t always have to be an expert to spot weaknesses. Often all you need is the ability to think logically.)*

*Take notes, even if it’s just a few lines. Try your best to write in your own words. This will help you digest the information and remember it.*

*When you’re done, call your mother/significant other/friend/roommate/ coworker and tell him/her you just read a really interesting/stupid/ brilliant/crazy paper. Then tell him/her what the paper was about. Succinctly. Don’t cheat by looking at your notes or the paper itself. If you can’t do this without cheating, you didn’t understand the paper. Go back and study it again.*

These pointers are modified from Prof. S. Porter, Earth Sciences, Fall 2005