

Syllabus: Geoscience 315W Paleobiology & Paleontology

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Office Hours: Monday 10:30 AM - 12:30 PM Wednesday 1:00 – 3:00 PM Or by appointment

Lectures and Discussions: Mon, Wed, Fri 9:15-10:15 AM 233 Natural Sciences

Laboratories: Mon 2:15-5:30 PM *or* Tues 2:15-5:30 229 Natural Sciences

TA: Michael Tapp **Office:** 312 Natural Sciences **Phone:** 474-7585 **E-mail:** fsjmt2@uaf.edu

Required Materials:

- Prothero, D.R., 2004. *Bringing Fossils to Life* – 2nd ed. WCB/McGraw-Hill, Boston, 503 p.
- TurningPoint clicker (new or used clickers are available at the UAF bookstore or online).
Scored clicking will begin on Monday, Sept. 17. Please be ready!
- Hamilton Bell 10x hand lens (also available at the book store)

Introduction: Paleontological investigations seek to describe temporal and spatial changes in Earth's flora and fauna within the context of geological processes, stratigraphy, and evolution. Consequently, the study of paleontology requires a working knowledge of more than one discipline. One of the principal goals of this course is to demonstrate the interdependence of scientific disciplines in any investigation of large-scale patterns and events in the natural world.

Due to recent advances in radiometric dating and the current demand for high-resolution time scales, paleontology has lost its place as the primary chronological tool. However, identification of fossil organisms remains critical to studies of stratigraphy, paleoecology, and paleoclimatology. No practicing geologist should be without a basic knowledge of the morphology and geologic range of common invertebrate and vertebrate fossils. To this end, labs will focus on the anatomy, morphology, geological range, and habitat of fossil phyla. The emphasis of the labs is thus biological, but the application to geological problems should not be underestimated. In order to use fossils to date rocks and interpret the depositional history and environment of the surrounding strata, a geologist needs to understand the biological requirements and limitations of the organisms. Were they sessile or mobile? Did they swim or crawl? Did they filter water for food, or were they predators? Could they survive in cold water, or did they require tropical climates? The answers to such biological and ecological questions may greatly constrain the geological interpretation. Furthermore, many new applications have been found for fossil data, from reconstructing the ecology of fossil communities to locating petroleum reservoirs. This class will highlight areas of science in which the study of fossils is gaining significance and illustrate new analytical methods.

Attendance: Participation in class discussions and exercises enhances your understanding and retention of the material. Therefore, 5% of your final grade will be based on attendance and participation. Students attending 90-100 % of the classes (missing no more than 3 hours) will receive an A for attendance. Those attending 80-90% of the time (missing no more than 8 hours) will receive a B, etc. Please try to remain punctual! Some of you will find this to be more difficult late in the semester, when it is still dark at 9:15 AM.

Labs: Hands-on experience with fossils is essential to a complete understanding of the morphology and paleoenvironmental significance of the organisms discussed in class. The record of marine invertebrates is longer and probably more complete than that of marine vertebrates, terrestrial invertebrates, terrestrial vertebrates, or plants. Consequently, labs will focus on marine invertebrate fossils.

Each lab will begin with a brief review of the anatomy and taxonomy of the fossil group to be studied and/or a brief quiz on the lab material covered the previous week, so you will find it advantageous to be on time.

All lab exercises will be handed out in class the preceding week. Please do not forget to bring these labs with you on the following Monday! If you are unable to finish the exercise during the allotted lab time, lab materials will be left out in room 229 until the end of the week. Labs will be due weekly, at the beginning of the following lab period. The grade will decrease by 2 points for each day that the exercise is late. Permission will not be given to work on the next exercise until the late one is turned in.

Writing Sample: This is a writing intensive course (315W). Consequently, you will be expected to produce multiple drafts of a research paper (see below) and to explain your answers and ideas in short written paragraphs on lab exercises and exams. Writing is a skill that becomes easier with practice (really!). Hence, the goal of these assignments is to provide you with many opportunities to stretch your writing talents. No one (faculty included) produces a flawless draft on the first attempt. Remember to focus on progress, rather than perfection, and don't be afraid to modify your first draft! In order to assess your current strengths and weaknesses behind the pen (or keyboard), you will be asked to write a short (~2 page) essay comparing and contrasting two assigned readings. The feedback you receive will guide you as you prepare the first draft of your research paper. At the end of the semester, you can look back and review your progress.

Papers: Each student will complete an original research paper on the subject of their choice. This assignment is designed to encourage you to delve into the literature in your particular area of interest. In addition to exploring a new topic, the paper gives you a chance to be graded on something other than your performance on exams and lab exercises. Selection of a topic is entirely up to you, but I will be happy to help you find the references that will form the basis of your paper. The final paper should not be a "book report." I expect you to compare and contrast a variety of opinions on your selected subject. In order to do this, you will need to consult multiple sources, all of which should be research papers. At least 4 of your basic references must be journal articles, not encyclopedias, textbooks, or websites, though these may also be consulted to flesh out your paper, provide additional figures, or track down the primary references.

Research papers must be referenced throughout and must include a bibliography. I will provide you with a format for citations and references. To help avoid end-of-the-semester panic, first drafts will be due on or before October 31. Because of the early deadline, you will need to select your topic by the end of the second week of class. Once I have read your first drafts, I will schedule a brief conference with each of you, during which we will discuss suggested changes. Revised, final drafts are due on November 28. Although your grade will be based upon the quality of your final draft, failure to turn in an outline or first draft on time will result in a 5- or 10-point deduction from your final grade, respectively. Revisions are not intended as a penalty, but as a chance for you to get some feedback regarding the content or style of your paper so that you can improve your grade. Ultimately, revisions offer you the opportunity to correct oversights and hone your science-writing skills. However, it is important to note that revision requires additional effort. You will not raise your grade if you do not improve upon your original submission.

Disabilities Services

The Office of Disability Services implements the Americans with Disabilities Act (ADA) and ensures that UAF students have equal access to the campus and course materials. I will work with the Office of Disabilities Services (474-7043) to provide reasonable accommodation to students with disabilities. Please let me know at the beginning of the course if accommodations should be provided.

Grading: Grades will be weighted as follows: 55% class and 45% lab. The class grade will be determined by performance on two midterm exams, a comprehensive final exam, homework exercises, attendance, and a research paper. The lab portion of the grade will be based upon lab exercises, weekly quizzes, and a final lab practicum.

Class

2 Midterm Exams: 20% (10% each)

Final Exam: 10%

Research Paper: 15%

Homework Exercises: 5%

Attendance: 5%

Lab

Laboratory Exercises: 30%

Laboratory Practicum: 10%

Weekly Lab Quizzes: 5%