

PALEONTOLOGY
GEOL 321, Section 1, 4 credit hours
Monday, Wednesday, Friday 11:00-11:50am – Room 204 Science 1
Thursday 12:00–1:50pm – Room 204 Science 1 (Lab)
Spring Semester 2014

Instructor: Dr. Leigh M. Fall

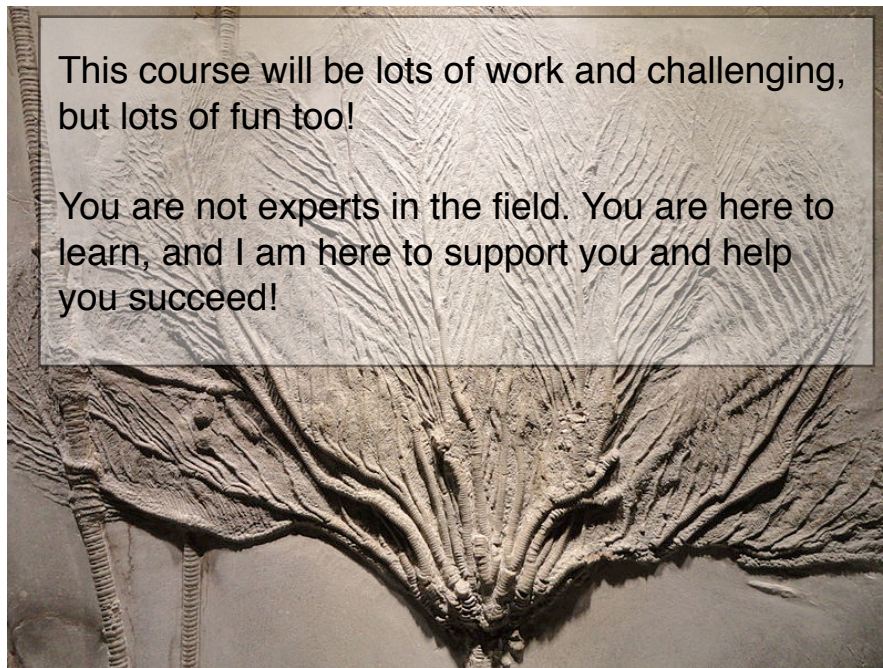
Office: 213 Science 1

Office hours: M 1–2 pm, T 9–10 am, W 1–2pm, or by appointment

- Please email me for appointments. I generally respond within 24 hours, except after 8pm during the week and on weekends. Please do not email me through Angel.

Office phone: (607) 436-2615

E-mail: leigh.fall@oneonta.edu



This course will be lots of work and challenging, but lots of fun too!

You are not experts in the field. You are here to learn, and I am here to support you and help you succeed!

Tips on Using This Syllabus:

- *Make sure you understand the syllabus.* Everything you need to know is contained within this document. If not, please ask!
- Use the intended learning outcomes to evaluate your academic progress throughout the course.
- Refer to the course schedule often. Be aware of quiz and assignment due dates. Enter the dates into Google calendar (or another calendar like it) to have automated alerts for due dates.
- Refer to the assignment descriptions and point value often.

Expectations:

- Attend all classes and labs and arrive punctually.
- Come to class with reading assignments finished.
- Get help when needed.
- Engage in all class and lab assignments.
- Complete assignments neatly, thoroughly, and with great thought.
- Reflect on assignments to evaluate what you have learned.
- Prepare for the exams in study groups with peers.
- Be open and respectful of other student's opinions.

Prerequisites:

Geol 220 or Biol 181

Required Text:

Benton, M. J., and Harper, D. A. T., 2009, *Introduction to Paleobiology and the Fossil Record*, Wiley Blackwell, 592 p.

Supplemental Text:

Boardman, R. S., Cheetham, A. H., and Rowell, A. J., 1987, *Fossil Invertebrates*, Blackwell Science, 713 p.

Clarkson, E. N. K., 1998, *Invertebrate Palaeontology and Evolution*, 4th ed., Blackwell Science, 452 p.

Moore, R. C., Lalicker, C. G., and Fischer, A. G., 1952, *Invertebrate Fossils*, McGraw Hill, 766 p.

Catalogue Course Description:

Fossils are a fundamental component of the rock record and provide the only direct evidence of past life on Earth. Fossils can help solve many geologic and biologic problems of interest, such as the dating of events in the geologic record, interpretation of depositional environments, paleogeography, climate change, the nature of mass extinction, and the history of biodiversity, at a temporal perspective unavailable when studying modern systems. In this course students will learn how to address questions and solve problems related to these topics through lab activities involving hypothesis testing, interactive lectures, field projects, and discussions of the scientific literature.

Extended Course Description:

Fossils are cool and are fun to collect! But, paleontologists do more than collect and catalog fossils for a museum. Why is it important to study paleontology? Paleontology is the scientific study of the past life. Paleontology reveals information on the origins of life, climate change, extinction, geologic time, biodiversity, and the tree of life. Now, that is cool! This course will increase your proficiency in observation skills and understanding of the scientific process. The emphasis in this course will be on making observations, collecting data, and analyzing fossil and sedimentological information to answer questions of interest to geologists and biologists

for understanding how the natural world works. I hope you have fun as you gain a new awareness of past and present biosphere. This course requires students to use Angel to take quizzes, submit assignments, and retrieve grades.

Course Purpose:

Living organisms have been present for 85% of the history of the Earth and have shaped the planet in a myriad of different ways as life has evolved. This course presents information on the evolution of the biosphere during its last 3.8 billion years of history. This course will help you understand how changes in today's world affect the distribution and diversity of plants and animals through investigating Earth's past. You will be able to use your skills to predict how plants and animals will be affected by current global changes through natural and anthropogenic processes. This course will help you transfer what you learn in the classroom to the real world.

Student Learning Outcomes Addressed by This Course:

- Students will demonstrate their ability to describe and identify geologic materials.
- Students will demonstrate their understanding of how life has evolved through geologic time.
- Students will demonstrate their ability to collect and analyze geologic information in field and laboratory settings.
- Students will demonstrate their ability to apply scientific reasoning and technology to solve geologic problems.
- Students will demonstrate their ability to work collaboratively to solve geologic problems.
- Students will demonstrate their ability to communicate scientific and technical information effectively through appropriate oral, visual, and written presentation.

Classroom Procedure:

- This course requires *at least* four hours of class work each week. Some work will take place outside of the classroom. Students should plan to spend 2–3 hours out-of-class time in academic study for every one hour of class time. This course will be taught using lectures, laboratory exercises, field trips, and assessments. Note that each class is scheduled to meet 50 minutes and each lab is scheduled to meet 1 hour and 50 minutes. Assignment and assessments will support students in accomplishing the intended learning outcomes.
- Assessments will consist of activities to evaluate your knowledge and abilities to accomplish the intended learning outcomes. There will be different types of assessments: assignments related to lecture and laboratory activities, quizzes, and exams. Not all assessments will be used for grading purposes. Please take advantage of all the assessment opportunities you will have in this course by using the assessments to reflect on the depth and value of your learning.
- This course uses active learning techniques to provide students with a way to engage in the classroom material. It is for the benefit of students to be present in class to participate in the activities.
- Students are *strongly encouraged* to read the textbook to enhance their learning. Textbooks are not doorstops!
- This course requires that students spend time outside of class and lab to study the

invertebrate groups. One lecture a week will be geared toward introducing the group. A study set of invertebrates will be available to learn the general features of the group used in identification. Other supplement information will be available through the textbook and books on fossil identification.

- Students will need a 3-ring binder to keep their sketches of fossils. Most materials for the sketchbook will be provided to the students.
- This course **requires** that students take the Indiana University Plagiarism Tutorial. The link to the tutorial is located on Angel under the Communication Links on the first page. Students must give the instructor a certificate of completion by the due date on the course schedule.
- The course material will be provided to you either as a handout in class or as an assignment to download and print from Angel. You may need to have access to the Internet to complete some assignments. If you do not have Internet access on a personal computer, consider using the on-campus computer labs. For more information about on-campus computer lab schedules and locations, go to <http://www.oneonta.edu/its/computerlabs.asp>. If you need help with computer applications, such as Microsoft Word and Excel, for this course or other courses, go to <http://www.oneonta.edu/its/training-students.asp>.

Participation:

For this course, your participation is upmost important. This course consists of informative and fun in-class and lab activities. Therefore, you should take your participation in the course very seriously because it is a large component of your assessment. Your participation reflects your readiness to learn! Please come to class prepared with questions and insights to offer others.

Recommended Study Habits:

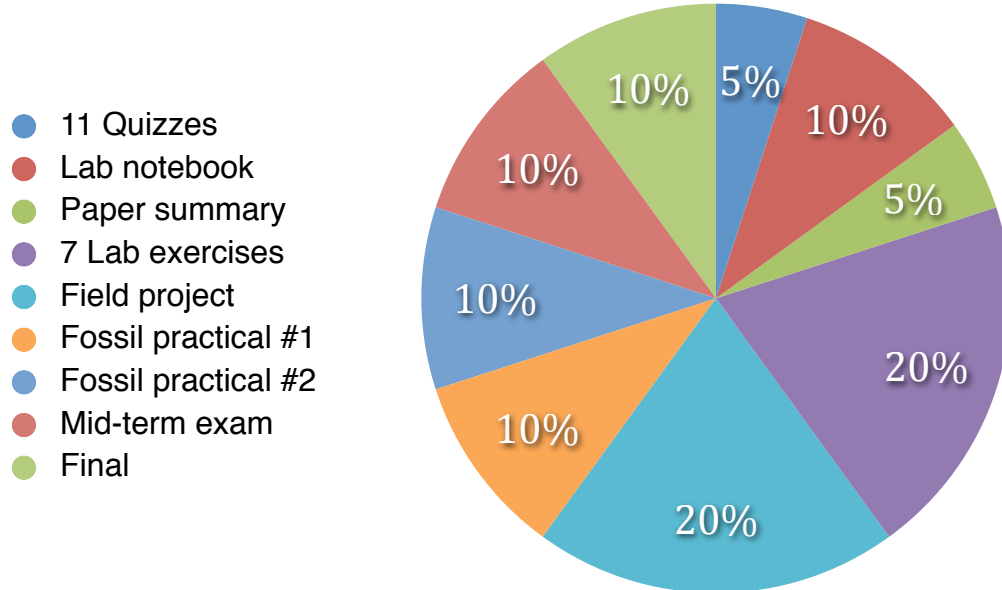
You should keep up with the reading assignments. Highlight the textbook or take notes as you complete the reading assignments. Just memorizing definitions is not enough for the course. Your goal is to apply your knowledge. I suggest that you form small study groups to prepare for the exams. You should take advantage of my office hours.

Grading Procedure:

A grade book will be available in Angel. Final grades will be distributed according to the standard University rubric below:

Percent	Grade	Percent	Grade	Percent	Grade	Percent	Grade
93-100	A	83-86.9	B	73-76.9	C	63-66.9	D
90-92.9	A-	80-82.9	B-	70-72.9	C-	60-62.9	D-
87-89.9	B+	77-79.9	C+	67-69.9	D+	<60	F

Grading in this course will be based on the following:



Assignment Descriptions:

Quizzes

All fossil group quizzes are taken at the beginning of class time on the Monday after their introduction. Quizzes consist of multiple-choice, true/false, and fill in the blank questions. The goal of the quizzes is to help students learn the material and prepare for the fossil practical.

Lab Notebook

You will use a notebook to draw and make notes for aid in learning the invertebrate groups. You will keep your drawings in a 3-ring binder. Drawing paper will be provided. Don't worry, you do not need to be Picasso. Drawing what you see is a great way to learn the features of organisms. Here are some drawing guidelines: (1) Do not copy the textbook's or other published figures; rather, draw what you see (and not what you think ought to be seen) and use the book or other guides to determine what it is you are seeing; (2) The primary drawings for each organism should be no smaller than half of a page, even for the smallest and simplest of the organisms; (3) Your drawings should have clean, simple lines. Keep shading or stippling to a minimum; (4) Don't crowd the page. Write on only one side. Notes and sketches should have plenty of room around them and not be crowded together; (5) Use pencil only. No pen! Draw with a light touch. Feel free to edit the drawing as necessary – erasing, revising, and retouching. Don't spend a lot of time trying to get something exactly right; (6) Label your drawings fully and use text to explain them; (7) Posing good questions is as important a skill as observing.

Practical Exams

This course uses a practical exam to evaluate how well students learned the different invertebrate groups. There are two exams scheduled. The first practical covers sponges, corals, brachiopods, bryozoans, and clams. The second practical covers snails, cephalopods, trilobites, other

arthropods, and echinoderms. Although the second practical is cumulative, it will mainly focus on groups covered since the first practical. Each week students will be introduced to each group. Students will be provided with a tray of fossils to identify hard and soft parts, taxonomy, and stratigraphic ranges. Students are responsible for learning the groups outside of class.

Paper Summary

You will read the review paper titled “Early animal evolution: emerging views from comparative biology and geology” for an in-class discussion. After the discussion, students will write a one-page summary of the paper for assessment.

Lab Exercises

This course uses lab exercises that will require students to carefully gather data and, in some cases, share the data with the class on Google documents in order to evaluate a hypothesis. Most of the time the exercises cannot be fully completed in the time allotted for lab. Lab exercises should be started in lab while you have the help of the instructor and the other students. These exercises will be due at the beginning of the next lab period, unless otherwise specified. Materials for the lab exercises will be provided for students. Due to the nature of the conceptual nature of the labs, there usually is not a “right” answer; answers will depend on how the data is interpreted to address the hypothesis. Please see Appendix 1 for a general rubric used in grading of laboratory exercises. The exercises are weighted differently, meaning that each one will have a different point value.

Field Trips

There are two **MANDATORY** field trips for the course. Both field trips are on Saturdays. The first field trip (scheduled for April 12) is to the Beneski Natural History Museum on the campus of Amherst College in Amherst, MA. The drive is approximately three hours from Oneonta. Students should plan to leave early to ensure an early return to campus. The second field trip (scheduled for April 19) is to a road outcrop near the town of Catskill, NY. The drive is approximately an hour and a half (1-1/2). Students will need to bring lunches with them on both trips. Additional logistical information regarding the field trips will be provided during class.

Field Project

This course requires a field project that includes a field trip to the Catskills. The field trip is **MANDATORY**, and is scheduled on Saturday, April 19. Students will be measuring section, describing rocks, identifying fossils, and collecting other pertinent data. Please write the date on the calendar in your computer, iPhone, iPad, or whatever device you chose. It is your responsibility to make it. Additional logistical information regarding the fieldtrip will be provided during class.

Exams

There is a mid-term exam and final exam. The mid-term exam will cover the material up until the time of the exam, and the final will cover the remaining material. Although the final exam is cumulative, it will mainly cover the material for the latter part of the course. The exam is done in

one class period. The format of the exam will be a combination of short answers and essays.

Course Policies:

Make-up Exams

No make-ups exams will be given without prior approval of the instructor by phone or e-mail **with at least 24 hours notice**. The only **acceptable** excused absences for a make-up exam include field trips, religious reasons, military leave, jury duty, intercollegiate athletics, trips of college performing organizations, documented illness, death of a close relative, and inclement weather. Please see the College Handbook for complete descriptions of each category (<http://www.oneonta.edu/collegehandbook/excused-absences.asp>). You must provide the instructor with documentation of the excused absence.

Late Policy

Late is late, whether its 1 minute late or 1 month late. Assignments are due at the beginning of class by 11:05am or lab by 12:05pm— **no exceptions!** All parts of your work must be turned in by the stated deadline to be considered on time. Sometimes unexpected life emergencies arise during the semester, and therefore everyone gets **one freebie late-work pass**. You can use your free late-work pass for any assignment you desire (NOT a quiz, scientific paper review, or an exam!), and you can turn in that assignment within one week of the original due date.

Academic Dishonesty

Academic misconduct of any kind will not be tolerated and is completely unnecessary. You are responsible for your own learning. If you cheat or plagiarize during this course you will: (1) Receive a zero on the assignment; (2) Receive a zero for that portion of the class (labs, projects, exams); (3) Fail the class and be reported to the Dean.

Attendance

It is your job to show up for class on time. Your attendance in lecture and in lab is mandatory and is your own responsibility. If you miss lab or lecture for any reason you will still be held responsible for the material covered in that session. In the case of unexcused absences (<http://www.oneonta.edu/collegehandbook/excused-absences.asp>) you may not be given a chance to make up the work for credit, though it would be to your advantage to see me in office hours to make sure you understand the topics covered while you were out. For policies regarding absences, please see: <http://www.oneonta.edu/collegehandbook/class-attendance.asp>.

Cell Phones

Please avoid using your cell phone during class and lab.

“Rocks are records of events that took place at the time they formed. They are books. They have a different vocabulary, a different alphabet, but you learn how to read them.”

—John McPhee, Writer

Course Schedule

Important Note: Course schedule subject to change by the instructor according to the students' needs or course delays.

Date	Read	Topic	Due Date
1/15 (W)		Introduction	
1/16 (Th)		No lab	
1/17 (F)	Chp. 1	Paleontology as a science	
1/20 (M)	Chp. 2	Geologic time	
1/22 (W)	Chp. 2	Correlation	
1/23 (Th)	Lab 1	Fossils in time and space	
1/24 (F)	Chp. 2	Paleobiogeography	Certificate due
1/27 (M)	Chp. 3	Taphonomy: Putting the dead to work	
1/29 (W)	Chp. 3	Taphonomy: Putting the dead to work	
1/30 (Th)	Lab 2	Biostratigraphy: Graphic correlation	2/14
1/31 (F)	Chp. 11	Porifera (Sponges): Basal metazoans	
2/3 (M)	Chp. 3	Taphonomy: Putting the dead to work	Quiz 1 (sponges)
2/5 (W)	Chp. 3	Taphonomy: Putting the dead to work	
2/6 (Th)	Lab 3	Relationship between sampling and diversity	2/14
2/7 (F)	Chp. 11	Cnidaria (Corals): Basal metazoans	
2/10 (M)		Taxonomic rules of the game	Quiz 2 (corals)
2/12 (W)	Chp. 5	Evolution by natural selection	
2/13 (Th)		Open lab	
2/14 (F)	Chp. 12	Brachiopoda: Lophophorates	
2/17–2/21		Break – No class	
2/24 (M)	Chp. 5	Species and speciation	Quiz 3 (brachiopods)
2/26 (W)	Chp. 5	Cladistics: There is a method in the madness	
2/27 (Th)	Lab 4	Evolution of Caminalcules	3/21
2/28 (F)	Chp. 12	Bryozoans: Lophophorates	
3/3 (M)	Chp. 5	Cladistics: There is a method in the madness	Quiz 4 (bryozoans)
3/5 (W)	Chp. 5	Exam #1	
3/6 (Th)	Lab 5	Evolutionary trends using echinoids	3/21
3/7 (F)	Chp. 13	Bivalvia (Clams): Molluscs	
3/10 (M)	Chp. 7	Mass extinctions: The world is ending!	Quiz 5 (clams)

3/12 (W)		Invertebrate group review	
3/13 (Th)		Fossil practical #1	
3/14 (F)	Chp. 13	Gastropods (Snails): Molluscs	
3/17 (M)	Chp. 7	Mass extinctions: The world is ending!	Quiz 6 (snails)
3/19 (W)	Chp. 10	Origin of metazoans	
3/20 (Th)		Open lab	
3/21 (F)	Chp. 13	Cephalopods: Molluscs	
3/24 (M)		Discussion of Knoll and Carroll (1999) paper	Quiz 7 (cephalopods)
3/26 (W)	Chp. 20	Diversification of life	Summary of paper
3/27 (Th)	Lab 6	Mass and gradual extinctions	4/11
3/28 (F)	Chp. 14	Trilobites (Ecdysozoans)	
3/31–4/4		Break – No class	
4/7 (M)	Chp. 19	Tracks and traces	Quiz 8 (trilobites)
4/9 (W)	Chp. 4	Paleoecology	
4/10 (Th)	Lab 7	Saturday field trip: Beneski Natural History Museum (Amherst, MA)	
4/11 (F)	Chp. 14	Other arthropods (Ecdysozoans)	
4/14 (M)	Chp. 4	Paleoecology	Quiz 9 (arthropods)
4/16 (W)		Field project prep	
4/17 (Th)	Field project	Saturday field trip: What can fossils tell us (Van Leuven Lake, Catskill, NY)	5/5
4/18 (F)	Chp. 15	Echinoderms (Deuterostomes)	
4/21 (M)		Field project	Quiz 10 (echino)
4/23 (W)		Field project	
4/24 (Th)		Open lab	
4/25 (F)	Chp. 15	Echinoderms (Deuterostomes)	
4/28 (M)		Field project	Quiz 11 (echino)
4/30 (W)		Invertebrate group review	
5/1 (Th)		Fossil Practical #2 (cumulative)	
5/2 (F)		Field project	
5/5 (M)		TBA	
5/12 (M)		Final (11:00am–1:30pm)	

ADA (Americans with Disabilities Act) Statement

Students Diagnosed with a Disability—All individuals who are diagnosed with a disability are protected under the Americans with Disabilities Act, and Section 504 of the Rehabilitation Act of 1973. As such, you may be entitled to certain accommodations within this class. If you are diagnosed with a disability, please make an appointment to meet with Student Disability Services (SDS), 209 Alumni Hall, ext. 2137. All students with the necessary supporting documentation will be provided appropriate accommodations as determined by the SDS Office. It is entirely your responsibility to contact SDS and concurrently supply me with your accommodation plan, which will inform me exactly what accommodations you are entitled to. You will only receive accommodations once you provide me with an SDS accommodation plan. Any previously recorded grades will not be changed.

Importance of Academic Integrity

The academic activities of the College, which contribute to the fulfillment of the College mission, are dependent upon the honest and open communication of ideas among students and faculty. Fundamental to academic integrity is a genuine respect for knowledge and intellectual inquiry. The academic community cannot thrive when these principles have been compromised by any of its members; therefore, this policy specifies the procedures to be implemented in cases where violations are suspected.

Violations of Academic Integrity: Academic Dishonesty

Academic dishonesty is defined as any act by a student that misrepresents or attempts to misrepresent to an instructor or any College official, the proficiency or achievement of that student or another student in any academic exercise, or that is intended to alter any record of a student's academic performance by unauthorized means.

It is the student's responsibility to read and understand the policy on all aspects of academic integrity as published in this publication and the *Catalog*.

An Example of Academic Dishonesty: Plagiarism

- Using materials (either specific words or unique ideas) from another person's work without acknowledgment
- Using quotations without identification as such or paraphrasing without specific identification of the source
- Copying and/or modifying another person's computer file, program, printout, or portion thereof for use in an assignment without permission of the instructor*
- Knowingly permitting one's computer file, program, printout, or portion thereof to be copied or modified by another student for use in an assignment without permission of the instructor

Emergency Evacuation Procedures

In the event of an emergency evacuation, classes meeting in Science 1 are directed to Chase Gymnasium so that College officials can account for all persons. Please review the College's Emergency Evacuation Procedures and Shelter-in-Place Procedures at the following web address: <http://www.oneonta.edu/security>.

Appendix 1: General Grading Rubric for Lab Exercises

Grade	Description of Work Earning that Score
A	Work was all done thoroughly, neatly, and correctly. Answers to quantitative questions included units and procedures were written out clearly. Answers to discussion questions were thorough and logical and showed independent thought. Student worked well in collaborative efforts in lab. Lab was excellent.
B	Work was mostly done thoroughly, neatly, and correctly. Answers to quantitative questions may not always have included units or shown equations. Answers to discussion questions may not always have showed thorough logic or independent thought. Some answers may have been incorrect. Student worked well in collaborative efforts in lab. Lab was good.
C	Work was average. Answers to quantitative and discussion questions were not thorough enough and may have been incorrect or unclear, not included units or shown equations. Some answers may have been hard to follow. Student put moderate effort into collaborative efforts in lab. Lab was average.
D	Work was sloppy and lab was incomplete. Not all questions were answered; units and equations were not shown. Most answers were incorrect or did not fully answer the questions. Student put little effort into collaborative efforts in lab, mostly let other students do the work, and copied down answers. Lab was fair.
F	Work was largely incorrect, sloppy, or incomplete. Most questions were not answered and units and equations were never shown. Student put no effort into collaborative group work in lab and merely copied answers from other students. Lab was poor.
0	Lab was not turned in by the due date. Check the lab policy.