

Ramapo College of New Jersey – School of Theoretical and Applied Science
GEOL 326 Paleontology, Paleoecology and Paleoenvironments
Fall 2009 – 4 credits

Lectures:	MR 11:30 am – 1:00 pm	Lab: R 2:00 – 5:15 pm
Classroom:	G-401	
Text books:	D.E.G. Briggs and P.R. Crowther 1990, <i>Paleobiology: A synthesis</i> . Blackwell. (This is available as a series of .pdf files, available online on course Moodle page. Do NOT purchase the second edition!)	
	M.J. Benton & D.A.T. Harper, 2009, <i>Introduction to Paleobiology and the Fossil Record</i> . Blackwell, ISBN 978-1-4051-4157-4.	
Materials:	<ul style="list-style-type: none"> - 10x magnifier (available in bookstore) (<i>same as required for GEOL 105</i>) - Clicker ('Turning Technologies RCRF-01 Response Card': available in bookstore) (<i>same as used in GEOL 101 & 105</i>) 	
Lab fee:	\$50, plus a \$5 entry fee for the Connecticut field excursion	
Prerequisite:	GEOL 105, Fundamentals of Geology (formerly SENS 105, Funds. Earth Science) <i>or</i> GEOL 101, Introduction to Geology <i>or</i> BIOL 101, Introduction to Biology <i>or</i> BIOL 110, Fundamentals of Biology I	
Instructor:	Dr. Emma C. Rainforth, Associate Professor of Environmental Science/Geology	
Office:	G-418	
Phone:	office 201-684-7209 (x7209 on-campus); cell 845-664-0024	
Email:	geology@ramapo.edu	
Office hours:	M 2:00-5:00, or by appointment.	
For more info:	http://phobos.ramapo.edu/~erainfor	

Course description

This is an interdisciplinary course in which students will use paleontology and sedimentology to interpret ancient environments and the ecosystems they supported. Students will begin with a review of aspects of geology required for paleontological studies: geologic time, plate tectonics, and sedimentary rocks and their depositional environments. There will also be a review of evolutionary theory and ecological and paleoecological principles. The bulk of the course is split into two sections. First, an overview of the major depositional environments, the typical fossil organisms that are found preserved in them, the processes of fossilization, and how the ecosystems of particular environments have changed through time. This will be followed by a survey of the history of life, with case studies in which we will examine several important fossiliferous units in both marine and terrestrial settings, and use paleontological (biological) and sedimentological (geological) data to reconstruct the paleoecology and ancient physical environment. Lab sessions will include fossil identification and analysis and several field visits to sites in New Jersey, Pennsylvania and Connecticut.

This course fulfills the upper-level Geology requirement for the Environmental Science major. It may also be used as an elective in the Biology and Environmental Studies majors and Environmental Science minor. It counts towards the Earth Science teaching certificate. It is a Writing Intensive course.

Course objectives

1. Students should be able to interpret the mode of life of an unidentified fossil specimen
 - Students will be required to identify the fossil, analyze its functional morphology and consider the mode of life of other members of this fossil group.
2. Students should be able to analyze a fossil assemblage and reconstruct its geological and paleoenvironmental contexts
 - Students will be required to identify the fossils present, determine the probable age of the assemblage, analyze the rock and ascertain the probable environment of deposition, and determine if the assemblage is a life or death assemblage.
3. Students should be able to explain the importance of paleontology to other realms of knowledge including geology, biology, and 'global change'
4. Students should be able to effectively communicate paleontological information both orally and in writing
 - Students will be required to formulate a hypothesis, obtain and critically evaluate authoritative information, and present a formal paper (both in writing and orally).

Grading

The grading breakdown is as follows:

15%	Two take-home tests
20%	Literature review paper and Presentation
10%	Weekly journal
40%	Labs
15%	Final exam

Percentages will be rounded to the nearest whole number and then converted to a letter grade, approximately as follows (*this grading scheme will differ from that of other classes!*) (+/- will be used as appropriate): A's, 85-100; B's, 72-85; C's, 58-72; D's, 50-58; F, <50%.

Course Requirements and Expectations

- Evaluation for the course will be based on a variety of formats including take home tests, a literature review paper, lab exercises, field reports, and a cumulative final exam.
- Some material will be presented in traditional lecture format; outline notes will be provided on Moodle but you are expected to take notes.
- Some material will be discussion-based; it is imperative that you have read the assigned reading *before* coming to class comprehend material presented later in the course.
- You should be spending a *minimum* of two hours per credit on this course outside of lecture time (i.e., >8 hours per week). This time will include the assigned readings, take-home tests and paper.

Readings

- Please complete the designated reading *before* coming to class. (This is important throughout the course, but especially so for 'red' lectures!)
- Material from Briggs and Crowther will be divided among the class – each student will not (usually) be required to read the designated material in its entirety.
- Supplemental material will be available on reserve in the library or on Moodle. In particular, you may find the following useful: H. G. Reading, *Sedimentary Environments*, 3rd ed., Blackwell Publishing, 1996, ISBN 0632036273.

Lecture Notes

- The PowerPoints used in lectures are provided on Moodle. *Use these lecture notes as a skeleton from which to flesh out your own notes* – the slides are primarily to organize me during the class!
- Either print out the lecture notes before class, or save a tree and download to a laptop and bring that to class.
- Do not rely solely on the text book for studying - *take good notes!*
- Organization is always useful. I suggest a sturdy 3-ring binder and using loose-leaf paper instead of a spiral-bound notebook.

Take-home Tests (15%)

- Purpose: to assess learning on an on-going basis.
- Test #1 is mandatory; the lower grade of tests 2 & 3 will be dropped. The 2 tests that count toward the final course grade will be 7.5% each.
- Tests are not cumulative.
- Because one test grade will be dropped, and these are take-homes for which you have a week, make-ups will not be permitted except under extenuating circumstances, for which written documentation will be required.
- Tests are take-home, open-book, and open-note and may consist of multiple choice, fill-in-the-blanks, short answers (which will require inferences and interpretations) and a short essay (less than one page), for which some internet sources may be required (all sources, including notes and text, must be cited!).
- Tests are due as follows; they will be provided one week prior to these dates:
 1. Basic concepts – Oct. 19
 2. Organisms/history of life 1 – Nov. 9
 3. Organisms/history of life 2 – Nov. 30

Labs (40%)

- Purpose: to develop observational, analytical and critical thinking skills.
- Labs will include specimen description, identification and interpretation, paleontological methodologies (mostly 'paper-based'), and field observations and field collection and analysis.
- Each of the three field trips will result in a written report (minimum 2.5 pages each).
- All labs and field reports are due the following Thursday.

Literature Review Paper, Presentation (20%)

- Purposes: to practice synthesizing material; to develop report-writing and presentation skills.
- This paper will be a review and synthesis of peer-reviewed literature to address a paleontological issue of your choice. You will also give a powerpoint presentation on your paper.

Policies

Attendance

Attendance is mandatory. Your first absence will suffer no penalty; after that, every missed class will reduce your course grade by 2%. (If you have extenuating circumstances, provide documentation: doctor's note, death certificate, etc.) A late arrival or early departure will constitute half an absence and will be penalized correspondingly. If you miss no classes, you will receive an extra 2%.

Office Hours

I require you to meet with me, individually, twice during the semester during office hours (or other pre-arranged times), to touch base with you, about your progress in the course, address any concerns you may have (about the course, general education/majors, and any other college-related matters), etc. These meetings are mandatory. (You are, of course, also encouraged to come to office hours whenever you need to – you are not limited to two meetings!)

Classroom behavior

Disruptive behavior will not be tolerated. Please respect both the instructor and the other students by not holding your own conversations, leaving and returning, offering remarks not related to the subject matter, using electronic devices, etc. Treat everyone in the classroom with respect. Beverages are permitted (but be sure to remove containers to the trash/recycling as appropriate), but no food. Please leave the tables clean at the end of class.

Field Behavior

- Students should **NOT** view class time spent in the field as an opportunity to socialize. Students are expected to be prepared for spending the entire class period outside, sometimes hiking and conducting fieldwork away from cleared trails (i.e., “bushwhacking”). Appropriate clothing are thick and strong enough to resist thorns, etc. Field trips will not be canceled or postponed except for cases of heavy rain, so students must be prepared for moderately inclement weather. Hiking boots and long pants are required for field excursions, and rain gear (jackets, ponchos, pants) is recommended on days of light rain or when vegetation is wet from recent precipitation or condensation. You should bring your Rite-in the-Rain field notebook (if you have one, otherwise a regular notebook), two pencils (pens may run on write-in-the-rain paper when wet), pocket magnifier, and water for drinking in the field. Food is permitted on field trips, but it should be eaten only while traveling in the van or during scheduled breaks in the field.
- Students are encouraged to take measures to reduce the likelihood of tick bites. Tick prevention generally includes one or more of the following: wear long pants that are a light color to easily spot ticks; tuck and tape your pants inside your socks, and tuck your shirt inside your pants; apply insect repellants on shoes, socks and pant legs, and inspect your body and clothing at home for ticks. Please do not apply volatile repellants before the trip, and at the field site do not apply volatile repellants upwind from the class.

Use of Electronic Devices in Classroom

Laptops may be used to facilitate note-taking. Other electronic devices, including (but not limited to) cellphones, PDAs, iPods, Blackberrys etc., are not to be used in the classroom. Please turn cell phone ringers off in class time.

Communication

If I need to contact you individually, I will do so by e-mail, to your Ramapo email account (per College policy). General class announcements will be posted to the class by email. I strongly recommend checking email the evening before class in case there are last-minute announcements.

Assignment Submission

- All written assignments (paper, journals, field reports) are to be submitted by e-mail, as attached documents.
- ***You will receive an emailed acknowledgement that I have received your assignment*** within 48 hours; *if after that time you have not received an email from me, it means I did not receive your email to me.* In order to not have

a late penalty assessed, ensure you save copies of all outgoing emails to your Sent Mail folder in case you need to retrieve them to prove to me when you sent them.

- **I can only open documents saved as .doc (Microsoft Word), .rtf (rich text file) or .txt (text file without any formatting).** If you create your document in a program other than Word (e.g. Microsoft Works, Word Perfect), please "Save As" an .rtf or .txt file, because I can not open their default file formats (.wps or .wpd files).
- *Assignments (other than labs) will not be accepted in other formats, including hard copy.*

Revisions

- Because this is a writing intensive course, you will submit a draft of your paper and a revision; the grades for both will be factored into the final assignment grade. Field reports may (optionally) also be revised, as long as revisions are received in a timely manner (see 'Deadlines', below); the grade received for revised reports will replace the grade of the first draft.
- Do not *rely* on the revision process as a way to get a good grade; low grades will generally occur because you failed to follow the written directions for the assignment, so I will not point out all the things you missed – you will have to refer back to the directions, and to the rubric, to figure out where you went wrong.
- Field report revisions are due at 11:59 pm on the tenth day after I return the graded original by email (*not* 10 days after you get the email - if you only check your email every two weeks, you may miss the deadline). If you miss the deadline, your original assignment grade will be the one that counts.

Deadlines

- Deadlines are to be adhered to. I will not remind you when deadlines are. Extensions *may* be granted under exceptional circumstances.
- Labs are due the Thursday after the lab session in which the lab was begun.
- If you miss a deadline for a lab or an original assignment (i.e. *not* a revision), turn in the assignment anyway: I will grade it if possible, although you will get a 10% penalty for that assignment.

Academic Integrity

- Students are expected to read and understand Ramapo College's academic integrity policy, which can be found in the College Catalog. Members of the Ramapo College community are expected to be honest and forthright in their academic endeavors. Students who violate this policy will be referred to the Office of the Provost.
- My penalties are as follows (subject to review by the Provost in each instance): first occurrence, zero grade for assignment; second occurrence, failing grade for course.
- For written assignments you will have the opportunity to correct any plagiarism before it goes to the Provost. If it is not fixed adequately in a timely fashion, it will be referred to the Provost.

Incompletes

College Policy: Incompletes are given in exceptional circumstances when approved by the instructor, and when *requested by a student who has satisfactorily completed at least two-thirds of course requirements* prior to the end of a term, for *reasons of illness or other emergency*. When the work is completed prior to announced dates (at the latest, 5 weeks prior to the end of the next semester), the grade assigned replaces the I. If work is not satisfactorily completed by that date, the grade is changed to F.

Students with Disabilities

If you have a disability or special need that has been documented with the Office of Specialized Services, and wish to discuss academic accommodations, please see me as soon as possible. All such requests will be treated confidentially.

Schedule with assignment deadlines (subject to change!)

Please ensure you bring paper, pencils and eraser, and pocket magnifier, to all lab sessions including field labs. For field labs please bring a field notebook if you have one, and on 11/5, bring zip-locs for your fossils.

	<i>Lecture</i>	<i>Readings</i>	<i>Lab (Thursday)</i>
R 9/3	Introduction and overview; what is a fossil?	BH ch. 1	Fossil Preservation
R 9/10	Nomenclature, Classification, Cladistics	BC 5.1-5.2.2	cladistic analysis
M 9/14	History of Paleontological Studies taphonomy & depositional environments	BC 6.5 BH ch.3, BC 3	n/a
R 9/17	Ecological principles; reconstructing paleoecology &	BH ch 4; BC 4.16-4.19, 5.3	paleoecological analysis

	paleoenvironments		
M 9/21	Evolution Variation in Fossils	BH ch. 5, + pp. 40-43; (BC 2.2)	n/a
R 9/24	Single-celled organisms; Field trip (stromatolites)	BH ch9; ch 19 p 437-440	Field trip - all day
M 9/28	Functional Morphology and Modes of Life	BH ch6, BC 4.1-4.9, 4.12-4.14	n/a
R 10/1	Simple (colonial) animals	BH ch11, ch.12 p.313-324	sponges, corals, bryozoa etc
M 10/5	Extinction	BH ch.7	n/a
R 10/8	Brachiopods and Bivalves	BH ch.12 p298-313; ch.13 (pp.326-338)	Brachiopods and Bivalves
M 10/12	Biogeography, biostratigraphy	BH ch.2; BC 5.4-5.7	n/a
R 10/15	Molluscs 2: Gastropods and cephalopods	BH ch 13 (pp338-end)	Gastropods, cephalopods, other molluscan classes
M 10/19	No class (Emma away)	n/a	n/a
R 10/22	Arthropods	BH ch 14	Arthropods
M 10/26	Origin of Life; Precambrian life, Cambrian explosion	BH ch8, 10, BC 1.1-1.5, 2.13.1	n/a
R 10/29	Echinoderms, Graptolites	BH ch.15	Echinoderms, Graptolites
M 11/2	Cambrian - Devonian life history; Burgess Shale, Hunsrück, Rhynie etc	BC 1.6-1.8, 2.13.2-2.13.3, 3.11.2-3.11.4, Moodle	n/a
R 11/5	Field trip: East Stroudsburg	on Moodle	Field trip - all day
M 11/9	Carboniferous - Triassic life history	B.C. 1.9.1-1.9.2, 2.13.4-2.13.5, 3.11.5	n/a
R 11/12	Vertebrates	BH ch.16-17 (to p.471)	Vertebrates
M 11/16	Jurassic life history, Newark Supergroup	BC 3.11.6-3.11.7, Moodle	n/a
R 11/19	Plants	BH ch18, BC 4.10	plants
M 11/23	Cretaceous life history	BC 1.10, 2.13.6-2.13.7, Moodle	n/a
M 11/30	Trace fossils	BH ch.19	n/a
R 12/3	Field trip: Dinosaur State Park	Moodle	Field trip - all day
M 12/7	Cenozoic life history; Green River, Messel	B.C. 1.11, 2.13.8, 3.11.8-3.11.9, Moodle	n/a
R 12/10	Hominids	BH ch 17 (p471-end), BC 1.12, Moodle	Hominids
M 12/14	Cenozoic life history 2 – Neogene, Quaternary	BC 2.13.8, Moodle	n/a

* BH = Benton & Harper, BC = Briggs & Crowther, Moodle = additional readings on Moodle

Readings in italics will be divided among the class among the class and discussed in class time. It is essential that you have read your assigned material, or all the students in your group will suffer!

Final Exam: tbd