SEDIMENTARY GEOLOGY (GEO 232)
FALL 2017
Sabin-Reed 101
Morning: T, Th 10:30 - 11:50 a.m.
Afternoon: Th 1:00 - 3:50 p.m.

Instructor: Bosiljka Glumac
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e-mail: bglumac@smith.edu
Office hrs: M 1:30-2:30pm; W 10:30-11:30pm
also: st*op by, call or e-mail at any time!*
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Course Description: A project-oriented study of the processes and products of sediment formation, transport, deposition and lithification. Modern sediments and depositional environments of the Massachusetts coast are examined and compared with ancient sedimentary rocks of the Connecticut River Valley and eastern New York. Field and laboratory analyses focus on the description and classification of sedimentary rocks, and on the interpretation of their origin. The results provide unique insights into the geologic history of eastern North America.

Course Goals: As a result of taking this course, you will be able to: 1) go to an unfamiliar outcrop and know what kinds of questions to ask and what types of data to collect; 2) interpret depositional settings based on rock types and sedimentary structures; 3) analyze successions of sedimentary rocks in the field and laboratory to interpret the geologic history of an area; 4) critically evaluate and effectively communicate scientific information; 5) draw connections between sedimentary geology and other scientific disciplines and everyday life; and 6) use what you learn as a base for future learning, greater enjoyment and appreciation of the natural world, and in making critical decisions of personal or societal importance. These goals are accomplished through working on specially designed field and in-class activities.

Electronic Resources: Copies of this document and other course related materials will be placed on Moodle. Field photos will also be posted on the course web page (link via Moodle).

Tentative Schedule of Exploration Topics and Activities:

Date		Morning	Afternoon
Th	9/7	Introduction to Sedimentary Geology	
T	9/12	Introduction to siliciclastic rocks	
Th	9/14	Intro to depositional environments and siliciclastic rock classification	**Field trip** to Turners Falls: Observation of siliciclastic sedimentary rocks
T	9/19	Follow-up on field activities; Introduction to sedimentary structures	
Th	9/21	Preparation for field trip to New York State: Intro to carbonate rocks and environments	**Field trip** to Turners Falls: Exploration of sedimentary structures
Fri-Sat	9/22-9/23	Joint Sed Geo & Paleo **Field trip** to New York State: Ancient marine sedimentary rocks and basin analysis	
T	9/26	Follow-up on weekend field activities; Practice describing & classifying rocks	
Th	9/28	Preparation for field trip to Chard Pond; Intro to measuring stratigraphic columns	**Field trip** to Chard Pond: Examination of siliciclastic rock successions
T	10/3	Chard Pond follow-up; Sedimentary structures – cont.	
Th	10/5	Terrestrial depositional environments; Intro to Deerfield Basin field project	**Field trip**: Deerfield Basin transect Stops 1 & 2
T	10/10	*No class: Autumn Recess*	
Th	10/12	Chard Pond follow-up; Preparation for weekend field trip	**Field trip** to Chard Pond: Sedimentary successions revisited

Date		Morning	Afternoon
Sat	10/14	**Field trip** to Plum Island: Modern depositional environments	
T	10/17	Follow-up on weekend field activities; Coastal siliciclastic depositional environments	
Th	10/19	**Field trip**: Deerfield Basin transect Stops 3 & 4	
T & Th	10/24 10/26	*No class: Geological Society of America (GSA) meeting*	
T	10/31	Terrestrial and coastal depositional environments – wrap-up	
Th	11/2	Marine siliciclastic depositional environments – shallow to very deep	*No class: Otelia Cromwell Day*
T	11/7	Marine siliciclastic environments – wrap-up; Intro to plate tectonics and sedimentation	
Th	11/9	Weathering processes; Composition and petrography of siliciclastic rocks	**Field trip**: Deerfield Basin transect Stop 5; field work wrap-up
T	11/14	Follow-up on field activities; Plate tectonics and sedimentation – cont.	
Th	11/16	Laboratory methods in sedimentology: Making and taking care of thin sections	Introduction to microscopy: Using petrographic scopes to study sed rocks
T	11/21	Petrography of siliciclastic rocks; Introduction to Deerfield Basin samples	
Th	11/23	*No class: Thanksgiving Break*	
T	11/28	Siliciclastic environments – wrap-up; Introduction to stratigraphy	
Th	11/30	Carbonate depositional environments - tropical theme for late November	Petrography of carbonate rocks
T	12/5	Carbonate depositional environments – continuing discussion	
Th	12/7	Case Study: Geologic history of the Appalachian basin – Sedimentary Basin Analysis [preparation for the final exercise]	
T	12/12	Case Study: Geological history and stratigraphy of the Grand Canyon	
Th	12/14	Final exercise – Sedimentary Basin Analysis; Course wrap-up	

Note: *The course schedule and procedures are subject to change in the case of unexpected circumstances. Any changes will be announced in class and/or via e-mail.*

Course Commitments: I would like to ask you to commit to learning in this class and to help facilitate learning in your classmates by completing all required assignments and by preparing for, attending and actively participating in all class meetings. There is a series of important topics, discussions, lectures, and field trips scheduled for this semester and in order for you to get the most out of this course you would definitely not want to miss any of them. If you have to miss a class due to unexpected circumstances, you must notify me before the class meeting takes place. *Thank you for making these commitments!*

Textbooks: Please make sure that you have access to these textbooks. They will be your main resource as you prepare for class meetings and work on completion of various assignments. You will also be using them extensively in class and therefore please bring them with you to each class meeting. Some copies will be available in the file cabinet in the classroom.

Prothero, D.R., and Schwab, F., 2014, Sedimentary Geology: An Introduction to Sedimentary Rocks and Stratigraphy, 3rd edition: W.H. Freeman and Company, New York.

Tucker, M.E., 2011, Sedimentary Rocks in the Field: A Practical Guide, 4th edition: John Wiley & Sons, New York (optional)

Other Materials:

Field clothes and shoes. Three-ring binder.

Provided by the instructor: field notebook, rock hammer, acid bottle, eye goggles, hand lens, sediment size gauge, and hardhat.

Grading:

- Deadlines: Exact deadlines for all required assignments will be given and reviewed in class.
- Grades:

• Various required exercises and assignments: field and in-class activities, homework assignments, quizzes, etc.	35%
• Chard Pond exercise	15%
• Deerfield Basin project (draft = 15%; final version = 15%)	30%
• Final exercise: Sedimentary Basin Analysis	20%

- Grading criteria:

grade	criteria
10	outstanding explanation with superior supporting information; unusual insights and flashes of brilliance; creative and original analyses and thoughts; goes well beyond minimum required for assignment.
9	good solid job on explanation, with excellent support from samples, examples, data, figures, etc.; excellent reasoning or excellent explanations; goes beyond the minimum required for the assignment.
8	good solid job; does what the assignment asks; decent reasoning or explanations; decent support by data, examples, figures, etc.
7	decent explanation but too general ***or*** some inaccuracies or flaws in reasoning ***or*** coverage is accurate but cursory and does not meet the minimum required for a complete answer.
6	does not effectively address assignment; fails to support assertions with data or examples; unclear explanations; inadequate understanding; major flaws in reasoning or explanations.
0	answer missing or does not answer the question

- Late work: Please turn in your work on time. This allows me to provide you with useful and timely feedback and helps you keep up with the course work. Please speak with me in advance if you have any problems meeting the deadlines. For any late assignments, I will be forced to take 10% off for each day overdue.

- Extra Credit:
  Throughout the semester I will recommend lectures that you can attend and write about (see separate instructions) for extra credit. You can submit (via Moodle) as many lecture reviews as you wish. Extra credit may be applied at the end of the semester in cases of borderline grades (i.e., if your grade is borderline, the extra credit may move it one step up; e.g. B+ may become A-).

SAFETY IN THE FIELD

While in the field always use common sense, good judgment, alertness, and follow these straightforward safety rules:

1. Wear appropriate field clothes and shoes.

The primary function of field clothes is to keep you warm, dry, and protected from the sun. In general, you should wear long pants and long sleeves, and have rain gear and spare warm clothing with you in case the weather turns bad. Wear waterproof, sturdy tennis shoes or hiking boots. Use gloves to protect your hands.

In case of warm weather wear white or light colored clothing made of cotton. Wear a hat, use sunglasses, sunscreen, and drink frequently. In cold weather, wear warm clothes and dress in layers with a wind- and waterproof outer layer (avoid cotton clothes in cold or wet weather). Wear a hat, use toe- and hand-warmers, eat and drink frequently.

2. Use the right equipment and use it properly.

Always wear safety glasses while using rock hammers! Use hard-steel hammers with a square head. Hammers should only be used on rock corners that stand a chance of being knocked off. Do not indiscriminately hammer, and do not swing the hammer wildly. Do not hammer at rocks above your head. Use downward blows, and ensure no one is standing close to you. Do not use a hammer to strike another hammer. Instead, use rocks chisels with a soft metal head that can be struck safely. Do not use chisels on solid rock faces; work them into existing fissures.

Avoid spilling acid on exposed skin. Wear hard hats when working at roadcuts where falling debris is a possibility.

3. Avoid risky situations and do not put others at risk.

Do not climb outcrops with others below you. Avoid walking and climbing on slick or slippery surfaces, and under or on top of unstable or overhanging cliffs. Never roll rocks down slopes and never throw them off the top of cliffs. Do not excavate at the base of sand or mud cliffs that might slump. **Use extreme care while crossing roads and working along busy roadcuts.**

4. Protect yourself from insects and poisonous plants.

Use insect repellent. Wear light-colored clothes so that ticks or other insects can be spotted more easily. Have frequent "tick-checks." Learn to recognize poisonous plants and avoid them.

For more information see: Planning for Field Safety, 1992, by American Geological Institute, Alexandria, Virginia, 197 p. (QE 45 P53)