Syllabus for Glaciology and Glacial Geology

Spring 2009

GEOLOGY 374-01 (CRN: 141)

***Credits**:* 3.0
Lecture meets: MW 1:00-1:50 p.m., 205 Science 1
Lab meets: W 2:00-3:50, 205 Science 1
Prerequisites: GEOL 370 *(LA)*

Instructor

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Textbook (required)*: Living Ice: Understanding Glaciers and Glaciation*, by Robert P. Sharp, Cambridge University Press, New York, 1988. ISBN 0-521-33009-2.
Additional articles will be made available in pdf format on Angel.

This course uses **Angel** (https://angel.oneonta.edu/) to transmit information such as the syllabus and lecture schedule, lecture notes, exercises, and links to online information. You will use your SUCO email ID and password to access course information on Angel.

Course Description

This course begins with an examination of glaciers—their formation, movement, and physical characteristics. Then we investigate the effects of glaciation on a regional scale, with special attention to erosional and depositional features in northeastern U.S. We will spend time characterizing the kinds of deposits and associated landforms that develop under and at the edge of glaciers, and based on ensemble features of deposits, interpret the depositional environments. We will also investigate the causes of glaciations, and discuss trends in modern glacier budgets.

Course Guidelines

The following list provides a baseline of what is expected from students in this course (quoted section from the list of *Student Responsibilities* approved by SUNY Oneonta).

"In class responsibilities

Students will:

- Attend all classes and arrive punctually.
- If unavoidably late for a class, enter quietly and unobtrusively, and behave in other required ways to minimize distraction.
- Remain alert and attentive during lectures, discussions, and other class/lab activities.
- Avoid unnecessary conversation during lectures, discussions, and other class/lab activities.
- Contribute to class experiences by asking relevant questions, offering relevant examples or views, adequately answering questions posed by others, engaging in critical and independent thought, and challenging both the instructor and the curriculum materials assigned for the course.

- Demonstrate courtesy and respect in dealing with instructors and classmates.
- Recognize and seek to understand diverse points-of-view.

Out-of-class responsibilities

Students will:

- Place academic obligations at the top of the list of college-related priorities.
- Plan to spend 2 to 3 hours out-of-class time in academic study for every one hour of class attendance.
- Thoroughly plan and prepare for classes.
- Notify the instructor in advance, if possible, or in a timely fashion, if unable to attend a class or lab, take a scheduled exam or quiz, submit a scheduled assignment, or remain in the classroom for the entire class meeting because of unavoidable circumstances."
- You are expected to **read each chapter before we cover it in class**. This will allow you to formulate questions concerning material that is not clear, or that you would like to have covered in greater detail. I use lectures to focus on the most important aspects of the topic. I strongly encourage you to ask questions during lecture. There are no 'dumb' or 'stupid' questions. Often the questions you have are shared by others. You should view lectures as the time and place for discussion, and I welcome your thoughts and questions!
- Any reasonable accommodation will be provided for students with physical, sensory, learning, or psychiatric disabilities. Please contact me for assistance as early as possible.
- If English is not your primary language and you would like to have additional time in which to take the exams, let me know. Anyone who needs additional time for the exams will be extended the same courtesy.

Grading

Grades will be based on exercises, midterm exams (2), a research paper, and a final exam.

Midterm Exams. Exam questions will consist of short answer essay questions. You are expected to absorb content as well as apply what you have learned to solve various problems. The final exam is cumulative. Mid-term exams are not.

Exercises/Field Trips. There will be 7-8 lab exercises and several field trips.

Project. Each student will write a research paper on a glacial topic of their choice. Guidelines for the paper will be handed out, along with a grading rubric early in the course.

Here's the breakdown on grading:

30%	Exercises
25%	Mid-term exams
25%	Final exam
20%	Research Project
100%	

Students will receive 1% point added to their grade by participating in an online course evaluation at the end of the semester.

Final grade assignments will be guided by the standard University curve given below.

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

Lecture and Lab Schedule *(this schedule is subject to change if more time is required for some topics).*

Date	***Day***	***Read***		***Topic***
Jan 14	W			Course Overview
Jan 14	W		Lab	Glacial features online
Jan 19	M	Ch. 1		Mineralogy of ice/Metamorphism of ice
Jan 21	W	Ch. 2		Accumulation and ice changes
Jan 21	*W*		*Lab*	*Crystal Size*
Jan 26	M			Regelation/Glacial flow/rheology
Jan 28	W	Ch. 3		Glacier types
Jan 28	*W*		*Lab*	*Glacier types online*
Feb 2	M	Ch.5		Glacial erosion: Abrasion/Quarrying
Feb 4	W	Ch. 6		Cirques and arêtes
Feb 4	*W*	L	*Lab*	*Glacial erosional features*
Feb 9	M	Ch. 6		Glacial landscape evolution
Feb 11	W	Ch. 6		Valley glacier profiles
Feb 11	*W*		*Lab*	Movie: Alaska's Rivers of Ice
Feb 16	M			Mass balance on a glacier
Feb 18	W			Mass balance on a glacier
Feb 18	***W***	***Ch. 8***	***Exam 1***	
Feb 23	**M**			**First Spring Break!!**
Feb 25	**W**			**First Spring Break!!**
Feb 25	**W**			**First Spring Break!!**
Mar 2	M	Ch. 7, 8		Glacigenic sediments
Mar 4	W	A		Glacial features in NY: the Fleisher model
Mar 4	*W*		*Lab*	*Mapping local glacial deposits*
Mar 9	M	B, C		Drumlins
Mar 11	W	B, C		Drumlins in NY
Mar 11	*W*		*Lab*	*Drumlins*
Mar 16	M	D, E		NY/PA Till shadows
Mar 18	W	F, G		Tunnel valleys and Eskers
Mar 18	*W*		*Lab*	*Till shadows*
Mar 23	M	H		Glacial Lakes in NY
Mar 25	*W*			*Field trip Otego Creek area*
Mar 25	*W*			*Field trip Otego Creek area*
Mar 30	M	I, J,K		Glacial history of NY
Apr 1	*W*	*A, K*		*Field Trip Schenevus Creek area*
Apr 1	*W*			*Field Trip Schenevus Creek area*
Apr 6	M			Causes of Glaciation
Apr 8	W			Causes of Glaciation
Apr 8	***W***		***Exam 2***	
Apr 13	**M**			**Second Spring Break!!**
Apr 15	**W**			**Second Spring Break!!**
Apr 15	**W**			**Second Spring Break!!**

Apr 20	**M**			**Second Spring Break!!**
Apr 22	*W*			*Field Trip to Vroman's Nose*
Apr 22	*W*			*Field Trip to Vroman's Nose*
Apr 27	M			Glacial Lakes in New York
Apr 29	*W*	*A, K*		*Field trip to Cooperstown/Cherry Valley*
Apr 29	*W*			*Field trip to Cooperstown/Cherry Valley*
May 4	M			Pleistocene Floods
May 6	*W*	*A, K*		*Field trip to Sidney area*
May 6	*W*			*Field trip to Sidney area*
May 11			***FINAL***	***Monday, 11:00-1:30 pm***

Readings

A. Fleisher, P. Jay, *Pleistocene sediment sources, debris transport mechanisms, and depositional environments: a Bering Glacier model applied to northeastern Appalachian Plateau deglaciation, central New York*, Geomorphology, Volume 6, Issue 4, April 1993, Pages 331-355.

B. Muller, Earnest, *Origin of Drumlins*, in A proceedings volume of the annual Geomorphology symposia series, vol. 5, p. 187-204, 1974.

C. Briner, J. P. 2007 (May): *Supporting evidence from the New York drumlin field that elongate subglacial bedforms indicate fast ice flow*. Boreas, Vol. 36, pp. 000_000. Oslo. ISSN 0300-9483.

D. Coates, Donald, *Glaciated Appalachian Plateau: Till Shadows on Hills,* Science, New Series, Vol. 152, No. 3729 (Jun. 17, 1966), pp. 1617-1619.

E. Braun, Duane D., *Deglaciation of the Appalachian Plateau, northeastern Pennsylvania--till shadows, till knobs forming "beaded valleys": Revisiting systematic stagnation-zone retreat*, Geomorphology, 75 (2006), 248-265.

F. Brennand, Tracy A., *Deglacial meltwater drainage and glaciodynamics: inferences from Laurentide eskers, Canada*, Geomorphology, 32 (2000), 263-293.

G. Hooke, Roger LeB., and Carrie E. Jennings, *On the formation of the tunnel valleys of the southern Laurentide ice sheet*, Quaternary Science Reviews, 25 (2006), 1364-1372.

H. Mullins, Henry T., and Edward J. Hinchey, *Erosion and infill of New York Finger Lakes: Implications for Laurentide ice sheet deglaciation*, Geology, v. 17, p. 622-625, July 1989.

I. *Pennsylvania In The Ice Age*, Sevon W. D., Gary M. Gleeger, and Vincent C. Shepps, Educational Series 6, Pennsylvania Geological Survey, 4th series, 1999.

J. Excerpt from *Geology of New York: A Simplified Account*, Isachsen Y. W., E. Landing, J. M. Lauber, L. V. Richard, and W. B. Rogers, editors, 2000, New York State Museum Educational Leaflet 28, 2nd edition, New York State Museum/Geological Survey.

K. Fleisher, P. Jay, Glacial Geology and Late Wisconsinan Stratigraphy, Upper Susquehanna Drainage Basin, New York, *In* Cadwell, D. H. (ed.), The Wisconsinan Stage of the First Geological District, Eastern New York, New York State Museum Bulletin, 455, 121-142.

Spring 2009*

January 11-13	Sunday-Tuesday	New student arrival & orientation
January 14	Wednesday	Classes begin
February 20	Friday	College closes after last evening class
March 2	Monday	Classes resume
April 3	Friday	College closes after last evening class
April 14	Tuesday	Classes resume
May 7-13	Thursday-Wednesday	Finals Week
May 16	Saturday	Commencement