

## **GLY 576: Glacial Geology**

**Spring 2007      3 credit hours**

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[http://web.cortland.edu/barclayd/glacial/576\\_index.htm](http://web.cortland.edu/barclayd/glacial/576_index.htm)

**Office hours:** MWF 11:30 am - 12:30 pm; TR 10:00 - 11:00 am;  
or by appointment, or at other times if I am available.

**Lecture:** 339 Bowers; M 4:20 - 6:10 pm

**Laboratory:** 339 Bowers; M 6:20 - 8:10 pm

**Textbook:** Bennett & Glasser, 1996, Glacial Geology: ice sheets & landforms

### **Catalog course description:**

“Glacial processes, landforms and deposits; Quaternary chronologies and dating methods; analysis and interpretation of glacial sediments and sequences. Emphasis on glaciation of New York state. One two-hour lecture, one two-hour laboratory, field trips. Prerequisite: GLY 261. (3 cr. hrs.)”

### **Course attendance policy:**

I expect you to attend all lecture and lab sessions, and all fieldtrips. Please familiarize yourself with official college policy regarding attendance and absences (Section 410.12 of the College Handbook).

Be responsible for your own education. If you miss a class, get the notes from a colleague as soon as possible. If you miss an exam or assignment, you must contact me as soon as possible with a valid reason for your absence or you will receive a zero. Ask questions and get involved in class discussions; your participation and willingness to learn will be used to aid final grade determination for borderline situations.

### **Evaluation of student performance:**

There will be a midterm and a final exam in this course (see schedule). These will respectively be worth 30% and 40% of your final grade. Material on these exams will be based on the material covered in lecture, in exercises and in homework assignments since the previous exam. Each exam will comprise a mix of multiple choice, short answer and data analysis questions. The remaining 30% of your grade will come from the average of your in-class exercises and homework assignments.

### **Academic accommodations:**

If you are a student with a disability and wish to request accommodations, please contact the Office of Student Disability Services located in B-40 Van Hoesen Hall or call (607) 753-2066 for an appointment. Information regarding your disability will be treated in a confidential manner. Because many accommodations require early planning, requests should be made as early as possible.

## Course objectives:

Glaciers have been pivotal in shaping the landscape of central New York. From the Great Lakes to the Finger Lakes, from the drumlin fields near Lake Ontario to the outwash deposits around Cortland; all are the products of glacial action. This course will help you understand the dynamics of glaciers and how glacial landforms and sediments are produced. We will focus on the glacial record of New York for much of the course, and use observations from modern glaciers and ice sheets in Alaska, Antarctica and New Zealand to understand the genesis of our regional landforms and sediments.

By the end of this course I expect you to be able to do the following (the classes that specifically address each objective are in italics; numbers following each course objective are NYSED sub-area teaching standards within Field 08):

1. Explain the climatic and physical basis for the location and motion of glaciers, and relate these to energy. [0001, 0014, 0023]  
*Lectures and labs in weeks 1 to 3.*
2. Explain how glaciers erode, transport and deposit sediment, and how these processes create specific glacial landforms and morphosequences. [0021]  
*Lectures and labs in weeks 4 to 10.*
3. Summarize the history of ice on Earth during the late Quaternary and relate this to the landforms and landscapes of New York. [0021]  
*Lectures and labs in weeks 1 and 11 to 15.*
4. Relate glaciers and glacial geology to societal concerns. [0002, 0024]  
*Homeworks in weeks 1 and 11.*
5. Identify and analyze glaciers and glacial landforms on topographic maps, radar images and aerial photographs. [0006]  
*Labs in weeks 1, 2, 4, 5 and 7.*
6. Identify and interpret glacial sediments and landforms in the field. [0021]  
*Fieldtrips in weeks 10, 13, 14 and 15.*
7. Analyze glacier dynamics and glacial landforms using computers, hand calculations and physical models. [0001, 0004, 0006]  
*Labs in weeks 1 to 5, 7 and 11.*
8. Synthesize and critique data and ideas from peer-reviewed literature. [0004]  
*Homeworks in weeks 1, 3 and 7, and lecture and lab in week 8.*

**Assessment of objectives:**

Graded work:	Course objectives (NYSED):								NSTA standard:				
	1	2	3	4	5	6	7	8	1a	1d	2a	3a	4a
Paper 1 - WAIS				✓				✓			✓		✓
Lab. 2 - profiles	✓				✓		✓			✓		✓	
Lab. 3 - models							✓					✓	
Paper 2 - central NY	✓		✓					✓			✓		
Lab. 4 - cirques					✓		✓					✓	
Midterm exam	✓	✓	✓	✓	✓		✓		✓				
Lab. 6 - drumlins					✓		✓			✓		✓	
Paper 3 - drumlins		✓						✓			✓		
Paper 4 - applications				✓				✓	✓		✓		✓
Final exam		✓	✓	✓	✓	✓	✓	✓	✓				

**SUNY Cortland Conceptual Framework:**

This course addresses Learning Outcome 2 of the SUNY Cortland Conceptual Framework. Specifically, students will develop in-depth knowledge of the science of Glacial Geology.

**Portfolio materials:**

Students enrolled in SUNY Cortland MAT or MSED programs in Adolescence Education are expected to develop and maintain a Professional Development Portfolio. I recommend inclusion of the following materials from this course (numbers following each assignment are the NSTA standards addressed):

Lab. 2 and/or Lab. 6 - (1d, 3a)

Paper 3 - (2a)

Paper 4 - (1a, 4a)

**Reading assignments:**

Recommended reading assignments for every class are posted on the course website ([http://web.cortland.edu/barclayd/glacial/576\\_index.htm](http://web.cortland.edu/barclayd/glacial/576_index.htm)). This list will be updated each week and includes links to online material.

**Fieldtrips:**

Come prepared to get dirty, cold and wet. I will do my best to be back by the end of class-time but cannot guarantee it.

**Laboratory equipment:**

Please bring a scientific calculator, a 12" ruler, a sharp pencil, an eraser and your textbook to every lab.

## Course schedule and activities:

	<u>Lecture</u>	<u>Lab</u>	<u>Reading</u>
01	22 Jan. Glaciers: where, when, what	L1 - Glacier types <b>Paper 1: B &amp; B (2002)</b>	Chapter 1
02	29 Jan. Mass balance & ice deformation	L2 - Glacier profiles	Chapter 3
03	5 Feb. Basal motion & glacial hydrology	L3 - Glacier models - <b>write-up</b> <b>Paper 2: R &amp; B (1990)</b>	Chapters 3 & 4
04	12 Feb. Glacial erosion & cirques	L4 - Cirques	Chapters 5 & 6
05	19 Feb. Erosional landforms	L5 - LIS erosion	Chapters 6 & 12
06	26 Feb. <b>MIDTERM EXAM</b>	-	-
07	5 Mar. Sediment transport & deposition	L6 - NY drumlins - <b>write-up</b> <b>Paper 3: drumlins</b>	Chapters 7 & 8 Assigned paper
-	12 Mar. SPRING BREAK - NO CLASS	-	-
08	19 Mar. Drumlin debate	Drumlin debate	Chapter 9
09	26 Mar. Moraines & outwash	L7 - Morphosequences	Chapter 9
10	2 Apr. FIELDTRIP: Malloryville Passover	Eskers, kames & kettles	Chapter 9
11	9 Apr. LIS history	L8 - NY history <b>Paper 4: applications paper</b>	M & H (1989) Chapter 2
12	16 Apr. Iceberg-calving glaciers	-	Chapters 10 & 11
13	23 Apr. FIELDTRIP: Ithaca	-	-
14	30 Apr. FIELDTRIP: Binghamton	-	-
15	7 May FIELDTRIP: Syracuse	-	-
16	14 May <b>FINAL EXAM</b>	-	-