Course Syllabus
Surface Processes & Hydrology (GLY 312)
In-Person
University at Buffalo

Instructor: Dr. James Boyle
Email: jamesboy@buffalo.edu
Office: Cooke 453 (zoom room)
Lectures: Tu/Th 9:30-10:50AM

Teaching Assistant: Hannah Holtzman
Email: hlholtzm@buffalo.edu
Labs: M 5:30-8PM or F 2:30-5PM

Student Hours: Tu 11AM-12PM, W 10-11AM, or by appointment (zoom room)
TA Student Hours: M 12:30-1:30PM or Th 1-2PM in Cooke 246

With COVID-19 continuing to spread throughout the country setting we are all required to follow sensible health precautions, including masking. Everybody must follow the UB and New York State health guidelines and remember that those rules are to protect others as well as yourself.

Public Health Compliance in Classroom setting:

The most current health guidelines can be found here (https://www.buffalo.edu/coronavirus/latest-update.html). Currently all persons on campus, regardless of vaccination status, must wear masks indoors in any non-private setting (with the exception of eating in designated areas).

Vaccination, including a booster, is also **required** for all students and those found not to be in compliance will be disenrolled from their courses but still financially responsible for those courses.

If you are unable to attend class you should contact the professor (Dr. Boyle) about accommodations to complete any work you might miss.

Course Description: Surface Processes and Hydrology is designed to provide students with the capability to analyze, evaluate and interpret data related to surface processes. In the first half of the course we will explore, in depth, the aspects governing the storage, movement, and residence times of water on the Earth's surface. The second half of the course will be directed toward understanding the processes and rates of landscape change. This course will draw on the disciplines of geology, physics, mathematics and chemistry.

Learning Outcomes: At the conclusion of this course students should be able to…

1) Interpret the history of a local landscape given information on the area's climate and geology.
2) Analyze and interpret data from surface processes as well as water flow.
3) Identify the underlying assumptions of models and how they might impact interpretations.
4) Explain the impact of hydrological factors on risk to human endeavors and vice versa.

Assessment of Learning Outcomes:

LEARNING OUTCOMES		OUTCOME ASSESSMENT
1	Interpret Local Landscape History	Weekly Homework 9-14, Exams II & III, Labs 8-13
2	Analyze and Interpret Data	Weekly Homeworks, Exam I & II, Labs
3	Identify Assumptions Underlying Models	Weekly Homework, Exams II & III, Labs
4	Explain the relationship between hydrology and humans	Weekly Homework 4-7 & 11, Exams, Labs

Materials: There are no required textbooks for the class. However, I will be drawing lecture information largely from the following two sources. If you intend to continue in this vein of geology and have the capacity to purchase these texts they are excellent references.
(1) *Key Concepts in Geomorphology*, 2nd edition by Bierman and Montgomery (2020)
(2) *Elements of Physical Hydrology* 1st **or** 2nd Edition, by Hornberger, Wiberg, Raffensperger and D'Odorico (2014)

Lectures: The lectures for each class will be posted on UBLearns, under the "Course Documents/Lectures" folder the night prior to the lecture.

Course Requirements and Expectations:

- I expect you to attend lectures whenever possible. While attendance is not an explicit part of your grade it is in your best interest to attend lectures and use the recording as supplemental review (link).
- I expect you to be respectful to your fellow students and not create distractions in the class.
- I expect that you will check UBLearns regularly for assignments and announcements.
- You **must** be present for lab to receive credit (see make-up policy section for extreme cases) and any student **missing more than two labs *without cause* will be cause for a failing grade**.

Means of Assessment: To succeed in this course you will need to do well in both the lecture and lab portions.

The specific details regarding grade distribution are as follows (and are subject to change):

Grade Point Distribution	
Weekly Homework	40%
Take-Home Exams	30%
Labs	30%

Grade scale (%)			
A	94+	C	74-77
A-	90-93	C-	70-73
B+	88-89	D+	68-69
B	84-87	D	65-67
B-	80-83	E	<65
C+	78-79		

Assignments

Weekly Homework: Every Thursday I will post a homework assignment under the "Assignments" tab on UBLearns, which will be due at the start of class one week later. These assignments will mostly be hypothetical scenarios where you need to apply material covered in lectures to find a solution. Some of this will be direct application of formulas while others will be more qualitative and logic-based.

Take-home Exams: Traditional exams are frankly poor measures of whether learning has actually occurred. In their place we will have three take-home exams due during the semester (exam I due March 6th, exam II due April 17th, exam III due May 18th, during exam week). Each of these take-home exams will be released one week before it is due under the "Assignments" tab on UBLearns. The exams will consist of a combination of short answer questions and data analyses on the topics most recently covered in class. You are allowed to use almost all resources at your disposal, including collaboration with your fellow students, but all work should be in your own words (i.e. no plagiarism). The only limit on resources is that you may not ask individuals not enrolled in the course for answers (i.e. no posting online to seek answers to questions).

Labs: Lab assignments will be due at the start of the following week's lab but can usually be completed in the allotted lab time. While the lab normally takes place in Hochstetter 430 there are three labs for which we will spend at least part of the lab time somewhere else. I have tentatively scheduled an outdoor lab for the week of April 4th but if the weather is looking better the week of March 28th we may go outside then instead (I will inform you as soon as we know for sure). The last week of lab we are planning to go on a tour of a local waste water treatment plant. More details will be made available as that date approaches. **You must show up for lab in order to receive credit and missing more than two labs without reason is grounds for automatic failure in the course**.

Make-up Policy: Due to the ongoing global pandemic it is likely that students will be unable to attend class at some point in the semester. Therefore, this class, with the exception of labs is set up to all for remote learning when/if necessary. In cases where you are unable to attend a lab or exam in person due to quarantine or other circumstances please let Dr. Boyle (for lecture) or Hanna Holtzman (for lab) know as soon as possible. An extension or other alternatives are almost always possible.

Academic Integrity: Academic integrity is a fundamental university value. Through the honest completion of academic work, students not only advance their educational objectives, they sustain the integrity of the university and facilitate the transmission of knowledge and culture based upon the generation of new and innovative ideas. The Undergraduate Academic Integrity Policy provides additional information about what UB considers to be academic dishonesty and the possible consequences for violating UB's policies on academic integrity. In particular, you should be sure that you are aware of what UB considers to be academic dishonesty and that you understand how to avoid academic dishonesty. If you are unsure about the meaning of any of this information please talk to me or your academic advisor about them and we will try to clarify our expectations.

Accessibility Resources: If you have any disability which requires reasonable accommodations to enable you to participate in this course, please contact the Office of Accessibility Resources, 25 Capen Hall, 645-2608, and also the instructor of this course. The Office of Accessibility Resources will provide you with information and review appropriate arrangements for reasonable accommodations.

Student Wellness: As a student you may experience a range of issues that can cause barriers to learning or reduce your ability to participate in daily activities. These might include strained relationships, anxiety, high levels of stress, alcohol/drug problems, feeling down, health concerns, or unwanted sexual experiences. Counseling, Health Services, and Health Promotion are here to help with these or other issues you may experience. You learn can more about these programs and services by contacting:

Counseling Services:	120 Richmond Quad (North Campus), phone 716-645-2720 202 Michael Hall (South Campus), phone: 716-829-5800
Health Services:	Michael Hall (South Campus), phone: 716- 829-3316
Health Promotion:	114 Student Union (North Campus), phone: 716- 645-2837

If you find yourself struggling with course-related issues, or any other issues regardless of the reason, please don't hesitate to contact me so I can help you resolve the difficulty or direct you to some other resource who can.

Lecture Schedule

Dates	Week	Tuesday	Thursday	Lab	Reading
1/31-2/4	1	A	B	No Lab	H Ch. 1
2/7-2/11	2	C	D	Hubbard Brook Basin	H Ch. 2.2-2.4
2/14-2/18	3	E	F	Precipitation/Infiltration	H Ch. 8.8, 3
2/21-2/25	4	G	H	Manning's Equation	H Ch. 4
2/28-3/4	5	I	J	HEC_RAS	-
3/7-3/11	6	K	L	Stream Discharge	H Ch. 9.4
3/14-3/18	7	M	N	Urbanization Risk Reduction	H Ch. 6
3/21-3/25	8	Spring Recess			-
3/28-4/1	9	O	P	Stream Table	B Ch. 8, 1
4/4-4/8	10	Q	R	Stream Gaging Field Trip	B Ch. 9
4/11-4/15	11	S	T	Geochronology	B Ch. 3
4/18-4/22	12	U	V	Glaciers	B Ch. 13
4/25-4/29	13	W	X	Factors of Safety	B Ch. 7
5/2-5/6	14	Y	Z	Himalayan Mtn. Erosion	B Ch. 12
5/9-5/13	15	AA	BB	Waste Water Plant Field Trip	B Ch. 14

Lecture Topics	
A	Introduction
B	Basics of Hydrogeological Cycle
C	Precipitation
D	Interception/Infiltration
E	Evaporation/Transpiration
F	Principles of Fluid Dynamics
G	Open Channel Flow
H	HEC-RAS
I	Rating Curves/Hydrographs/Flood frequency
J	Rating Curves/Hydrographs/Flood frequency

K	Runoff/Base Flow
L	Groundwater/Surface Water Interactions
M	Urban Hydrology
N	Waste Water
O	Fluvial Geomorphology I
P	Levels of Control on Geomorphology
Q	Fluvial Geomorphology II
R	Rates & Dates I
S	Rates & Dates II

T	Glacial Geology I
U	Glacial Geology II
V	Landslides I
W	Landslides II
X	Volcanic Geomorphology
Y	Tectonic Geomorphology
Z	Mountains: endogenic & exogenic
AA	Geomorphology & Climate
BB	Review