

GEOL 60095 - ST: Fluvial Processes

Fall 2016 Syllabus

Instructor: Dr. Anne Jefferson ajeffer9@kent.edu McGilvrey 210A

Meeting Times and Place: Monday and Wednesday 2:15-3:30 pm, McGilvrey 234

Office hours: Monday 12-1, 3:30-5, Wednesday 12-1, Friday 11-12:30 or by appointment.

"Final Exam:" Wednesday, December 14th, 2016, 12:45-3:00 pm

Learning outcomes: After completing this course, students will be able to:

- Qualitatively and quantitatively describe the ways that channel forms adjust in response to changes in the environmental controls operating upon river systems;
- Use field techniques and data analysis to describe and quantify fluvial form and process in pursuit of answering original research questions; and
- Read and interpret the scientific literature on fluvial geomorphology.

Sequence of Topics

1. Basic fluid mechanics and flow in natural channels

Aside A: Post-glacial rivers

Aside B: Tools and techniques in fluvial geomorphology

2. Sediment transport

3. Hydraulic geometry

4. Channel morphology

5. Sediment sorting and development of the longitudinal profile

6. Drainage basins, sediment budgets, and landscape evolution

Reading Material and Resources: Will be made available through the library or provided online at: <http://all-geo.org/jefferson/teaching/fluvial-processes/> or via Blackboard. The following books are on reserve at the library (3 hour checkout):

- Leopold, Wolman, and Miller. 1964. *Fluvial Processes in Geomorphology*.
- Knighton, D. 1998. *Fluvial Forms and Processes: A New Perspective*.
- Dingman, S.L. 1984. *Fluvial Hydrology*.

Grades and Assessment

Grades will be distributed based on the percentage of points earned. Point values needed to achieve a given grade may be adjusted downward at the end of the term, but will not be adjusted upward.

	A: 100-92%	A-: 91-90%
B+: 89-88%	B: 87-82%	B-: 81-80%
C+: 79-78%	C: 77-72%	C-: 71-70%

There will be no exams in this course. Instead, your grade will be based on preparing and leading 2 class discussions (20%), writing 3 short critical synthesis papers on the required and recommended readings (15%), your work on an individual or team original research project (55%), and participating in field trips and the Water and Land Symposium (10%).

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Class discussion leadership: Each student will lead a ~20 minute discussion of an assigned paper, two times over the course of the semester. For best success, follow the format and tips here: <http://evolution.berkeley.edu/evolibrary/teach/journal/journaltips.php>, here: <https://teachingcommons.stanford.edu/resources/teaching/small-groups-and-discussions/how-lead-discussion>, and here: <http://cgi.stanford.edu/%7Edept-ctl/cgi-bin/tomprof/posting.php?ID=736>. Grading will be based on your articulation of clear and appropriate learning objectives; your mastery of the material and concepts within the paper being discussed; and your ability to lead an engaging and productive discussion. Each discussion you lead is worth 10% of your course grade.

Critical synthesis papers: These papers will take a group of readings and integrate them by topic or theme, identifying common approaches or concepts, as well as contrasting or contradictory approaches or findings. These papers should not just be a summary of each reading in sequence. The synthesis papers will also include an element of critique. For example, "were the methods appropriate for their question or was there a better approach?" or "did later papers disprove some of the points in the earlier paper?" Finally, these synthesis papers should be concise - no more than 1000 words (2 pages single spaced). You do not have to write critical synthesis papers for topics where you are a discussion leader. Grading will be based on: mastery of material and concepts within the papers; degree of synthesis versus serial summarizing; appropriateness of critique; and concision. Each paper is worth 5% of your grade.

Field trips and Water and Land Symposium (10% of course grade): The best way to learn about streams and rivers is to see as many different types of streams as possible. This semester, I will offer 2.5 days of field trips early in the semester:

- A. West Branch Mahoning River at Jennings' Woods near Ravenna to learn and practice techniques. Half-day, weekday afternoon. Tentatively: Wednesday, September 21, 2-6 pm.
- B. Upper Cuyahoga River canoe trip + middle Cuyahoga River dam removal tour. Saturday TBD.
- C. Middle and lower Cuyahoga River tributaries: group reconnaissance of sites. (Optional.)

While not directly related to Fluvial Processes, the Kent State University Water and Land Symposium will highlight many topics relevant to streams and rivers. Your attendance at the Symposium is expected, to the maximum extent allowed by your other class commitments. This year's symposium is October 5-6, 2016. See the schedule and register here: <http://www.kent.edu/water>.

Original Research Project: This semester we will be learning about stream channel evolution in response to changes in water and sediment inputs. Many of our theories about how rivers work come from places where the sediment supply is ultimately sourced from the weathering and erosion of local bedrock, and where the dominant agent of erosion is liquid water. But, here in northeastern Ohio, our local bedrock is covered by glacially-deposited material and our topography is largely shaped by ice that only disappeared 14,000 years ago. My over-arching question to the class is this: *How does northeastern Ohio's glacial legacy shape the fluvial forms and processes we see today?* In other words, do the streams and rivers in northeastern Ohio behave the way we expect them to, based on the things that we will read and discuss together?

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Working as individuals or in teams of up to 3, you will:

- (1) identify a research question and hypothesis that tackles one small aspect of the overarching question;
- (2) select an appropriate field site (or sites) and methods to test your hypothesis;
- (3) write a proposal describing your question/hypothesis, rationale, sites, and methods;
- (4) do field work or GIS analysis (or both) and analyze the data as described in your proposal;
- (5) write an abstract of your work suitable for submission to a professional conference;
- (6) produce a poster of your work;
- (7) write a 2000-2500 word scientific paper on your research (4-5 pages single spaced), citing appropriate literature as background material.

You will be expected to spend minimum of 2-3 days in the field (or GIS lab) per person on the project, and grading of team projects will take into consideration the size of the team.

What?	When?	How much?
Proposal (team)		10%
Discussion of drafts	26 September	
Written proposal	30 September	
Abstract (team)		5%
Draft	21 November	
Final	14 December	
Poster (team)	7 December	15%
Paper (individual)	14 December	25%

Important Notes on Field Safety: Go into the field prepared with: clothing appropriate for the weather and field work to be done (plus a change of clothes); sturdy shoes; sun protection; insect repellent; needed medication; a first aid kit; food; and plenty of water. Know how to wade safely (e.g., <http://howtoflyfish.orvis.com/video-lessons/chapter-four-basics-of-stream-fishing/316-safe-wading-techniques>) or don't wade at all. If you are wearing chest waders, you must wear a tight wading belt. If you will be in a boat, you must wear a personal floatation device. Check the weather before you go in the field and do not go if there are flash flood or flood watches or warnings. Leave the field if there is lightning.

For this class, we will observe the following safety procedures in addition to observing all other Kent State University safety protocols.

- A. Do not go in the field alone.
- B. Someone else in the class and not going in the field with you (your "buddy") must know where you are going and what time you will be back to check in. Check in with your buddy when you leave the field or if your plans change.
- C. If you are someone's buddy and they do not check in, first try to reach them directly. If you cannot reach them, contact Dr. Jefferson immediately.

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University Policies

- **Official dates:** Students can self-add into courses only in the first week of the semester. University policy requires all students to be officially registered in each class they are attending. Students who are not officially registered for a course by published deadlines should not be attending classes and will not receive credit or a grade for the course. Each student must confirm enrollment by checking his/her class schedule (using Student Tools in FlashLine) prior to the deadline indicated. *September 11, 2016 is the last day to withdraw before a grade of "W" is assigned.*
- **Cheating and Plagiarism:** University policy 3342-3-01.8 deals with the problem of academic dishonesty, cheating, and plagiarism. None of these will be tolerated in this class. The sanctions provided in this policy will be used to deal with any violations. If you have any questions, please read: <http://www.kent.edu/policyreg/chap3/3-01-8.cfm> and/or ask.
- **Students with disabilities:** University policy 3342-3-01.3 requires that students with disabilities be provided reasonable accommodations to ensure their equal access to course content. If you have a documented disability and require accommodations, please contact the instructor at the beginning of the semester to make arrangements for necessary classroom adjustments. Please note, you must first verify your eligibility for these through Student Accessibility Services (contact 330-672-3391 or visit www.kent.edu/sas).
- **Attendance:** Your attendance and participation in all class sessions is expected. The university policy on attendance is detailed here: http://www2.kent.edu/policyreg/policydetails.cfm?customel_datapageid_1976529=203774

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Course Policies

- **Grade appeals:** I work hard to grade fairly and objectively, but mistakes can happen. If you feel one of I have made a mistake in grading or have graded unfairly, I only accept grade reconsiderations in writing. Please send me an email clearly explaining which assignment and question are at issue and a justification for why your answer is correct or deserves more points. If the assignment was marked by hand, you may need to scan it and attach it to your email.
- **Classroom accessibility for everyone:** You may make audio recordings of lectures, take pictures of the board, sit wherever you like in the classroom, bring in food or beverages, leave the classroom when necessary, etc. If there is something I can do to create a more comfortable learning environment for you, please never hesitate to ask, even if you're not registered with Student Accessibility Services. Please be respectful of your fellow students. Avoid interrupting your classmates, bringing strong smells or common allergens into the classroom, and blocking the aisles or doorway.
- **Digital Devices:** Feel free to use a digital device (laptop, cell phone, etc.) to take notes or look up material related to the topic being discussed in class. If your digital device use is not for class purposes, I will ask you to put it away and refrain from future use.
- *This class has zero tolerance for sexual harassment, assault, bullying, and inappropriate behaviors. Offenses will be reported to the appropriate university office.*