

GEO 449/549: Fluvial Geomorphology

Course Information and Syllabus, Spring 2012

Schedule: T R, 12:30-1:50pm

Location: 144 Wilkeson

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Instructor: Dr. Sean J. Bennett

Office: 126 Wilkeson Quad

Office Hours: T 2:00-4:00pm

Course Description: The course examines the classic themes in fluvial geomorphology, including channel hydraulics, sediment transport, dominant discharge, hydraulic geometry, regime theory, channel patterns, river networks, and river channel change, as well as emerging including models and prediction, riverine habitat and riparian vegetation, and stream corridor restoration.

SYLLABUS

Date	Topic	Assigned Reading	Assignment Due
<i>Part 1: Flow and Sediment Transport in Rivers</i>			
1/17	Fluid Flow and Boundary Layers I	B: 17-43; K: 96-107	
1/19	Fluid Flow and Boundary Layers II	B: 17-43; K: 96-107	
1/24	Incipient Motion	B: 44-54; K: 107-113	
1/26	<i>Seminar on Turbulent Flow</i>		Seminar presentations
1/31	Sediment Transport Mechanics I	B: 55-77; K: 118-141	
2/2	Sediment Transport Mechanics II	B: 55-77; K: 118-141	
2/7	<i>Seminar on Sediment Transport</i>		Seminar presentations
2/9	Bedforms and Flow Resistance	B: 78-140; K: 187-205	
<i>Part 2: River Channel Form and Process</i>			
2/14	Hydraulic Geometry and Regime Theory	B: 165-177; K: 167-187	Short Paper #1
2/16	<i>Seminar on Bedforms and Channel Geometry</i>		Seminar presentations
2/21	Alluvial Channel Patterns I	B: 141-204; K: 205-241	
2/23	Alluvial Channel Patterns II	B: 141-204; K: 205-241	
2/28	<i>Seminar on Channel Patterns</i>		Seminar presentations
3/1	Flow in a Meandering Channel	B: 141-204; K: 205-241	
3/6	Mechanics of Bank Erosion	K: 113-118	
3/8	<i>Seminar on Meandering Channels and Bank Erosion</i>		Seminar presentations
3/13	NO CLASS		
3/15	NO CLASS		
3/20	Confluences and Networks	B: 177-188; K: 55-64	
3/22	Longitudinal Profiles and Downstream Fining	B: 296-297; K: 242-260	Short Paper #2
3/27	<i>Seminar on Confluences, Networks, and Longitudinal Profiles</i>		Seminar presentations
3/29	Sediment Yield	B: 7-13; K: 65-95	
<i>Part 3: Adjustments and Prediction of the Fluvial System</i>			
4/3	Fluvial Geomorphology and Vegetation		
4/5	<i>Seminar on Sediment Yield and Vegetation</i>		Seminar presentations
4/10	Adjustments of the Fluvial System	B: 13-16; K: 261-335	
4/12	River Restoration		
4/17	<i>Seminar on River Channel Change and Restoration</i>		Seminar presentations
4/19	Conceptual and Numerical Models I		
4/24	Conceptual and Numerical Models II		
4/26	<i>Seminar on Fluvial Models</i>		Seminar presentations
5/4			Term Paper

Recommended Textbooks:

Rivers and Floodplains: Forms, Processes, and Sedimentary Record, by John S. Bridge, 2003, Blackwell Publishing, 491 pp., (ISBN: 9780632064892, ISBN10: 0632064897; denoted as **B** above).

Fluvial Forms and Processes: A New Perspective, by David Knighton, 1998, Arnold, 383 pp., (ISBN: 9780340663134, ISBN10: 0340663138; denoted as **K** above).

Resources: All students are encouraged to secure copies of the textbooks. All graphics shown in class will be posted on *UBlearns* in PDF format.

Course Evaluation: Two (2) seminars, two (2) minor papers, and one (1) term paper per student, plus class participation.

Topical seminars will comprise students choosing a recently published journal paper and presenting it to the class. These papers must be (1) pre-approved by the instructor, (2) published in 2011 or 2012 in an approved journal (see list below), and (3) related to the topic theme. Failure to adhere to any one of these criteria will result in a “0” grade. Each seminar day will include up to five (5) student presentations, with ~10 minute allotments per presentation and an additional 3 minutes for discussion (13 minutes total). A computer with projector will be available for student use. In addition, each student presenter must prepare a 250-word abstract of the chosen paper, written in their own words. Attending and participating in seminars, including asking questions of the presenter, is mandatory. No abstracts will be accepted after seminar presentation.

Each seminar will be worth 15 points, subdivided as follows: 10 points for scientific content and delivery; 2 points for abstract quality; 2 points for seminar format and organization; and 1 point for time management.

The minor papers are relatively short discussions (~5 pages long, 12-point font, and single-spaced in addition to figures, tables, and references) of a specific topic, focusing on the importance, relevance, and novelty of the subject. Brevity and clarity in writing style and organization will be stressed, and work is based solely on published literature. Plagiarism or the submission of work not your own will result in “0” grade. Topics must be approved by the instructor. No papers will be accepted after due date.

Each minor paper will be worth 15 points, subdivided as follows: 10 points for scientific content; 3 points for writing quality; 1 point for format; and 1 point for references and citations.

The term paper is a relatively long discussion (~20 pages long, 12-point font, and single-spaced in addition to figures, tables, and references) of a topic, focusing on the critical evaluation of the subject. It will include a literature review, identified gaps in current knowledge, and insight into new research opportunities. For undergraduate students, this paper will be based on published literature. For graduate students, this paper must entail the collection of data (field, experimental, synthetic, or survey; quantitative or qualitative), the reduction and analysis of previously collected data, the testing of new hypotheses, and/or the formulation or application of conceptual or numerical models. Plagiarism or the submission of work not your own will result in “0” grade. Topics must be approved by the instructor. No papers will be accepted after due date.

The term paper will be worth 35 points, subdivided as follows: 25 points for scientific content; 5 points for writing quality; 3 points for format; and 2 points for references and citations.

Class participation includes asking and answering questions during class presentations and seminars, and this will be worth 5 points.

Grades: Below is a table of all required work, deadlines, and the percentage points for student evaluations. Normal university grading procedures will be employed. I reserve the right to add a few percentage points to every student’s final grade.

Required Work	Date Due	% of Total Grade
Short Paper #1	5:00 pm, 2/14	15%
Short Paper #2	5:00 pm, 3/22	15%
Term Paper	5:00 pm, 5/4	35%
Seminar Presentations (2)	TBA	15% each (30% total)
Class Participation	NA	5%

General Guidelines for Seminars:

- All papers must be published in 2011 or 2012 in an approved journal (see below; no other journals will be accepted), and these must be related directly (not tangentially) to the seminar theme
- Students will present seminars standing in front of the class
- Students are allotted ~10 minutes per presentation, with an additional 3 minutes for questions; do not run over time
- Format should be restricted to ~8 to 12 PowerPoint slides, focused on the main points of the paper—title and author(s), main ideas, hypotheses or objectives of the paper, select observations, plots, graphs, or mathematical formulations, and concluding statements or summary
- Ensure all visual equipment is secured, in place, and working properly with the intended presentation
- Rehearsing the presentation is strongly recommended
- “Less” is generally “more”
- Speak to the audience and not the screen, use a relaxed, confident, and authoritative tone, make eye contact with the audience, and minimize body gestures and reading from notes
- Listen to the questions, and respond in a courteous, relaxed manner
- Respect each other at all times
- Students will be evaluated on the clarity, style, format, and professionalism of their presentation, their command of the topic, the effectiveness of the visual aids, and their time management
- Abstracts will be assessed for the quality of the writing and the efficacy in communicating the main points of the paper in 250 words
- Attendance and participation by all students is mandatory

General Guidelines for Papers:

- Papers should have the following headings: Abstract (250-word maximum), Introduction (with objectives of the paper), Methods (if applicable), Results, Conclusions, and References
- Papers will be assessed for content, accuracy, originality, presentation, organization, and overall quality of the writing
- Write concisely, much like a journal paper
- Keep observations, measurements, and results separate from discussion and interpretations
- Use your own voice; plagiarism will not be tolerated
- All figures and tables require a caption
- Equations should be numbered sequentially in order of appearance, and all variables defined
- All material presented must be accurately and correctly cited, and references should follow the style and format of the American Geophysical Union

List of approved scientific journals for seminar papers:

Advances in Water Resources	Journal of Hydraulic Engineering
Earth Surface Processes and Landforms	Journal of Hydraulic Research
Geological Society of America Bulletin	Journal of Hydrologic Engineering
Geomorphology	Journal of Hydrology
Hydrological Processes	River Research and Applications
Journal of the American Water Resources Association	Sedimentology
Journal of Fluid Mechanics	Water Resources Research
Journal of Geophysical Research-Earth Surface	