Syllabus, GEO 432/532: Applied Geomorphology (3 credit hours)
Spring, 2008, Tues. & Thurs., 8:00-9:20 AM, Wlkn. 210 (Digital Earth)
Instructor: Stephen Lancaster (Assoc. Prof.), Wlkn. 142, 737-9258,
Stephen.Lancaster@geo.oregonstate.edu
Office hours: Tue., 9:30-10:20 AM; Thu., 1-1:50 PM

Course Description and Overview:
From the catalog: “Effect of landform processes upon human activity; consequences of
resource management strategies on erosional balance within landscape; identification of
mitigation of natural hazards; role of geomorphic process studies in environmental
planning. Taught as seminar, themes TBA. Field trip(s) may be required; transportation
fee charged.
“PREREQ: GEO 322”

The term, “applied geomorphology,” can be interpreted to mean, “the techniques of
g geomorphology applied to real-world problems (i.e., things society cares about).” This
course will emphasize the application of the geomorphological techniques to real-world
problems. The course will focus on applied fluvial geomorphology.

Brief Course Outline:
I. Applied geomorphology overview
II. The big picture: Watersheds and channels
III. Agents of change: Fluvial processes
IV. Patterns and trajectories of change in fluvial systems
V. Putting it back together: some key issues and venues, problems and solutions

Communication with the Instructor:
The most reliable way to communicate with me is in person, preferably during my office
hours. If you need to send me email, alert me so that I expect your message. In general,
you should not consider email or voice mail reliable for communicating with me!

Instructional Objectives and Student Learning Outcomes:
Course Objectives:
The main objective of this course is to provide students with the tools, and the ability to
use them, for addressing real-world problems in fluvial geomorphology. A subsidiary
objective is to improve students’ scientific report-writing skills.

Learning Outcomes:
Students should learn the following:
1. Techniques for geomorphic assessment of streams in the context of their
   watersheds and the application of those techniques.
2. Basic knowledge of fluvial forms and processes and likely changes resulting
   from those processes.
4. Use of qualitative and quantitative data in writing a report in the form of a
   scientific paper.
Assessment/Evaluation of Student Performance:

Summary of course requirements and credit:

**GEO 432:**
- Quizzes, 5% each: 20%
- Final exam: 20%
- Reports for field trip #’s 1 & 2, 10% each: 20%*
- Written group report for field trip #3: 20%*
- Group presentation for field trip #3: 15%
- Class and field participation: 5%
- Total: 100%

**GEO 532:**
- Quizzes, 4% each: 16%
- Final exam: 16%
- Reports for field trip #’s 1 & 2, 10% each: 20%*
- Written group report for field trip #3: 20%*
- Group presentation for field trip #3: 15%
- Class and field participation: 5%
- Presentations on supplementary reading: 8%
- Total: 100%

* You must turn in all three written reports in order to receive a passing grade. See the policy on late reports below.

**Quizzes:**
Quizzes will be given in class, cover the material covered in the reading and lectures (including material covered by student presentations), and take 15 minutes each.

**Final exam:**
The final exam will be comprehensive and will also cover the reading and lecture material but will do so in more depth than the quizzes.

**Field trips and reports:**
There will be three (3) mandatory field trips during which you will apply some of what you learn in class. Handouts will help guide your field activity and writing. The reports will be due at the beginning of the class period on the due date; see the schedule below for due dates. Late reports will be accepted up to one week following the due date, but 10% will be taken off for each business day or part thereof that it is late.

Field trip #3 will be the basis for written and oral group reports. Groups will consist of 3-4 students each. Group leaders will be chosen from among the GEO 532 students and will be responsible for assembling groups from the remaining students. Group presentations will be given during the last week of classes.

**Class and field participation:**
This is a hands-on class, so it is imperative that you show up prepared. You will be graded in part on your participation in class discussions and field trips (students who are particularly helpful in the field may receive extra credit). Students will begin the term with “80%” in this category. Their actions—or inactions—will dictate whether this score rises or falls over the course of the term.
Oral presentations on supplementary reading (GEO 532):
In addition to the other required reading, students enrolled for graduate credit must present the material for at least one of the supplementary readings to the class. (If extra readings are available, GEO 432 students may apply to make presentations for extra credit.) These presentations should be approximately 15 minutes long and will be graded on completeness, clarity, and time.

Learning Resources:
Texts for required reading:
Readings will be posted online and/or collected in a binder in Wlkn 208 (student lounge).
Readings will be drawn primarily from one book that you may wish to purchase (e.g., through the publisher or Amazon; it’s become hard to find):


Several readings will also be assigned from the following books:


Supplementary texts you may wish to consult (available from instructor):


Computers/Online resources:
You will need to use computers and the class disk space to share and analyze data, and you may use the computers in Digital Earth. The course also uses Blackboard, where lecture notes, field trip handouts, and other resources are posted.
Outline, Readings, and Schedule:
Detailed Outline with Readings:

I. Applied fluvial geomorphology overview
   *Naiman RJ, and Bilby RE, River ecology and management in the Pacific coastal ecoregion, *NB*, pp., 1-10.

II. The big picture: Watersheds and channels
   a. Watershed-scale effects:
   b. Channel classification, scale issues:
      Thorne CR, Channel types and morphological classification, *THN*, pp. 175-222.
   c. Fluvial audits:

III. Agents of change
   a. Open channel flow:
      Bathurst JC, Environmental river flow hydraulics, *THN*, pp., 70-93.
      *Montgomery DR and Buffington JM, Channel processes, classification, and response, *NB*, pp., 13-42.
   b. Sediment dynamics:
      *Sear DA, The sediment system and channel stability, *BS*, pp. 149-177.
   c. Bank erosion and stability:


IV. Patterns and trajectories of change in fluvial systems

a. Stable channel configurations:

b. Styles of channel change:
   Hooke JM, Styles of channel change, *THN*, pp., 237-268.

c. Channel changes and unstable channel geometries:

V. Putting it back together: some key issues and venues, problems and solutions

a. Restoration:
   *Frissell CA and Ralph SC, Stream and watershed restoration, *NB*, pp., 599-624.

b. Mitigation of erosion and sedimentation problems:
c. Sediment budgets
   Reid LM and Dunne T, *Rapid Evaluation of Sediment Budgets*, pp. 1-24, 60-61, 124-130 (Ch. 1, 2, excerpts from Ch. 3, 4, 5).
   *Reid LM and Dunne T, Rapid Evaluation of Sediment Budgets*, pp. 20-60 (Ch.3, Evaluating sediment production from hillslopes and channels).
   *Reid LM and Dunne T, Rapid Evaluation of Sediment Budgets*, pp. 60-124 (Ch 4, Evaluating sediment transport and storage in channels).

d. Practice:
   Newson MD, Hey RD, Bathurst JC, Brookes A, Carling PA, Petts GE, and Sear DA, Case studies in the application of geomorphology to river management, *THN*, pp., 311-363.

* Supplementary readings to be assigned to students enrolled in GEO 532 for in-class presentations (GEO 432 students may “apply” for these assignments for extra credit).
<table>
<thead>
<tr>
<th>Student presenter</th>
<th>DATE</th>
<th>Class Meeting Topic</th>
<th>Activity/Due</th>
<th>Read</th>
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<td>1-April</td>
<td>1. Applied fluvial geomorph. overview</td>
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<td>3-April</td>
<td>2. Watershed-scale effects</td>
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<td>8-April</td>
<td>3. Channel classification</td>
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<td>II.b.</td>
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<td>10-April</td>
<td>4. Fluvial audits</td>
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<td>15-April</td>
<td>5. Open channel flow</td>
<td>Quiz</td>
<td>III.a.</td>
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<td>17-April</td>
<td>6. Sediment dynamics &amp; FT #1 brief</td>
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<td>III.b.</td>
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<td>19-April</td>
<td><strong>Field trip: fluvial audit of local streams, 8 am – 6 pm</strong></td>
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<td>22-April</td>
<td>7. Post-field trip debrief</td>
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<td>29-April</td>
<td>9. Stable channel configurations</td>
<td>Quiz</td>
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<td>1-May</td>
<td>10. Channel change styles &amp; FT#2 brief</td>
<td>FT#1 report</td>
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<td>3-May</td>
<td><strong>Field trip: local fluvial processes, 8 am – 6 pm</strong></td>
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<td>6-May</td>
<td>11. Post-field trip debrief</td>
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<td>8-May</td>
<td>12. Unstable channel changes</td>
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<td>IV.c.</td>
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<td>17-May</td>
<td><strong>Field trip: local restoration project, 8 am – 6 pm</strong></td>
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<td>20-May</td>
<td>15. Post-field trip debrief</td>
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<td>27-May</td>
<td>17. Sediment budgets</td>
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<td>V.c.</td>
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<td>29-May</td>
<td>18. Pre-presentation brief</td>
<td>Group time, Quiz</td>
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<td>3-June</td>
<td>19. Group presentations</td>
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<td>5-June</td>
<td>20. Group presentations</td>
<td>FT#3 report</td>
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<td>12-Jun</td>
<td><strong>(Thursday) Final Exam, 9:30-11:20 AM, WLKN 210</strong></td>
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1 Field trips may not take all of this time.
**University and Departmental Policies:**

**Students with Disabilities:** "Students with documented disabilities who may need accommodations, who have any emergency medical information the instructor should know, or who need special arrangements in the event of evacuation, should make an appointment with the instructor as early as possible, no later that the first week of the term. In order to arrange alternative testing, the student should make the request at least one week in advance of the test. Students seeking accommodations should be registered with the Office of Services for Students with Disabilities."

**Rules on Civility and Honesty:** The Department of Geosciences follows the university rules on civility and honesty. These can be found at [http://oregonstate.edu/instruct/cssa556/CIVHON556.htm](http://oregonstate.edu/instruct/cssa556/CIVHON556.htm).

Cheating or plagiarism by students is subject to the disciplinary process outlined in the Student Conduct Regulations. Students are expected to be honest and ethical in their academic work. Academic dishonesty is defined as an intentional act of deception in one of the following areas:

* cheating - use or attempted use of unauthorized materials, information or study aids
* fabrication - falsification or invention of any information
* assisting - helping another commit an act of academic dishonesty
* tampering - altering or interfering with evaluation instruments and documents
* plagiarism - representing the words or ideas of another person as one's own

**Student Collaboration:** You are allowed and encouraged to work together on the reports for field trip #’s 1 & 2, but there are strict limits to that cooperation. (1) You must cite all your sources of information, both written and oral, and failing to do so constitutes academic dishonesty. Since it is sometimes difficult to sort out who said what in a discussion setting, you may acknowledge such discussion broadly (e.g., “I discussed this assignment with Jane Doe and John Smith.”). Specific pieces of information that are directly attributable to another person or written work must be cited (e.g., “Lancaster told those on the field trip that…(John Smith, personal communication)”). (2) Citation is not a substitute for doing your own work. For example, turning in a paper that contains nothing but cited information (e.g., “I copied the entire assignment from Jane Doe’s work.”), while not academically dishonest, would be unsatisfactory and result in zero credit. (3) Finally, discussion alone does not result in work that is nearly identical in appearance to the work of another student. Two papers should not, for example, show nearly identical drawings.

In general, if you are in doubt ask the instructor and/or err on the side of too much citation and refraining from what might give the appearance of academic dishonesty.

**Other:** Behaviors disruptive to the learning environment will not be tolerated and will be referred to the Office of Student Conduct for disciplinary action.