

## **HYDROLOGY AND WATER RESOURCES – GEOG 425/525**

Winter 2012 Term, University of Oregon

Course Registration Number: GEOG 425 – 22815, GEOG 525 – 22829

Lecture: 8:30am – 9:50am Tuesdays & Thursdays, 214 McKenzie

Instructor, Mark Fonstad, Condon 107F, fonstad@uoregon.edu, 541-346-4208

Instructor Office Hours: Tuesdays & Thursdays 10:00am – 11:00am

GTF: Pollyanna Lind, Condon 105, plind@uoregon.edu, 541-346-4564

GTF Office Hours: Monday 12:30pm – 1:30pm

Geography 425/525 provides an introduction to hydrology, which is the study of the distribution, timing, availability and management of water resources. The course is organized around the hydrologic cycle, with units such as precipitation, runoff, evapotranspiration, subsurface flow, and storage. An entire course or courses could easily be taught on any one of the topics above, so by default this will be a broad-based survey. You will develop a broad understanding of general topics related to fresh water resources and will have the ability to discuss with water specialists some of the key assumptions inherent in their methods and recommendations. This is a good course for a future manager who works with experts in water resources. By-in-large, however, this will *not* be a class where you develop specialized skills in any one subfield of hydrology such as open channel flow or groundwater transport, so do not expect to be a hydraulic engineer or expert in groundwater hydrology at the end of the quarter. If portions of this class catch your fancy, I can help direct you to specialized classes on these specific topics within our department or elsewhere across campus.

In this course you will study and apply some quantitative models in hydrology. Calculus is not required, but you must be comfortable with algebra and spread sheet skills (you will use Excel extensively). Participation and questions are strongly encouraged during class time.

### **REQUIRED READINGS**

The required textbook for this class is: Ward, A.D. and Trimble, S.W. 2004.

Environmental Hydrology (2<sup>nd</sup> Edition). CRC Press. 504 p. It incorporates many changes and additions from the previous editions, so make sure you have this 2<sup>nd</sup> edition.

Additional readings may be supplied by the instructor during the term.

### **REQUIRED BACKGROUND**

To enroll in this class you must have taken MATH 112 and either GEOG 321 or GEOG 322. If you do not have these prerequisites, you should withdraw from this course.

## **LABS**

Labs provide practical experiences for completing hydrologic analyses, and thinking through complex water resources issues. As there is no dedicated lab section for this class, the individual labs have been designed to be take-home exercises. You are free to work with others on these exercises, but make sure that you do your own calculations and your own write-ups for these labs. Do not copy each others' written answers. Unless otherwise stated, I expect all answers to be written in complete sentences with all words correctly spelled. The class GTF is responsible for introducing and overseeing these labs. In the Schedule at the end of this syllabus, there are specific dates for when each lab will be introduced, and for when each lab is due. Labs must be turned in digitally on Blackboard by the class period noted – otherwise you will receive a ZERO on that assignment unless you have made arrangements with me beforehand. It is essential that you complete the labs because many of them build on knowledge you have gained from a previous lab. You are also welcome to use the SSIL lab to complete the labs.

## **GRADES**

There will be two exams in the class (a midterm and a final exam), each worth 30% of your total grade. Both are closed-note/closed-book. Labs will make up the remaining 40% of the grade for undergraduates (See lab grade breakdown at the end of this syllabus). Labs will make up 20% of the grade for graduates. In addition, graduate students will produce an applied remote sensing project that makes up 20% of their grade. This project will comprise a hydrologic analysis of a basin, a significant write-up of what was done, why it was done, and how well it worked. The final grade scale is as follows: A+: >98; A: 92-98; A-: 90-92; B+: 88-90; B: 82-88; B-: 80-82; C+: 78-80; C: 72-78; C-: 70-72%; D+: 68-70; D: 62-68; D-: 60-62; F: <60.

## **ACADEMIC DISHONESTY**

*I will not* tolerate cheating or academic misconduct/dishonesty in my courses; examples of these behaviors include (but are not limited to):

- Plagiarism (passing off the work of another as that of your own)
- Copying answers from your neighbors during exams/activities
- Dishonesty concerning reasons for absence from class
- Any other actions that might give you an unfair advantage over your classmates.

All cases of academic dishonesty/misconduct will be referred immediately to the Student Judicial Affairs Office. The penalties for engaging in academic dishonesty and/or misconduct can range from a grade of "F" for an assignment to an automatic failure of the course. Please consult the university policy at <http://studentlife.uoregon.edu/judicial/conduct/sai.htm>.

## **LATE/MAKE-UP WORK**

Late labs will not be accepted and make-up work will not be assigned, except in extreme circumstances and where you have documentation (i.e. doctor's note). If you must miss a lab section or exam due to illness or other unavoidable circumstances, you **MUST** notify the instructor prior to missing if possible.

## **DISABILITY SERVICES NOTICE**

I work hard to ensure a quality learning experience for all students. If you need specific accommodations to get the most out of this class, please let me know by (1) informing me of your particular needs, and (2) providing the appropriate documentation from the campus learning services office. I will make every effort to accommodate your needs, but you must notify me by the first week of class if you need special arrangements.

**NOTE:** I consider this syllabus a contract between myself and the students in this course. In writing this syllabus, I have obligated myself to follow the policies and procedures contained herein. You are responsible for understanding and following these policies as well. I reserve the right to make changes to this syllabus. You will receive verbal and written notification of major changes to course policies, procedures and content.

## **IMPORTANT CLASS ADMINISTRATIVE DATES**

Jan. 8: Process a complete drop (100% refund, no W recorded)

Jan. 15: Drop this course (100% refund, no W recorded)

Jan. 15: Process a complete drop (90% refund, no W recorded)

Jan. 16: Drop this course (75% refund, no W recorded; after this date, W's are recorded)

Jan. 16: Process a complete drop (75% refund, no W recorded; after this date, W's are recorded)

Jan.18: Last day to add this course

Jan.18: Last day to change to or from audit

Jan. 22: Withdraw from this course (75% refund, W recorded)

Jan. 29: Withdraw from this course (50% refund, W recorded)

Feb. 5: Withdraw from this course (25% refund, W recorded)

Feb. 26: Withdraw from this course (0% refund, W recorded)

Feb. 26: Change grading option for this course

## TENTATIVE SCHEDULE

DATE	TOPIC	CHAP	LAB
10-Jan	The Hydrologic Cycle & Water Resources	1	
12-Jan	The Hydrologic Cycle & Water Resources	1	
17-Jan	Precipitation	2	Lab 1 Intro
19-Jan	Infiltration and Soil Water Processes	3	
24-Jan	Evapotranspiration	4	Lab 1 Due, Lab 2 Intro
26-Jan	Evapotranspiration	4	
31-Jan	Runoff and Subsurface Drainage	5	Lab 2 Due, Lab 3 Intro
2-Feb	Runoff and Subsurface Drainage	5	
7-Feb	Stream Processes	6	Lab 3 Due
9-Feb	MIDTERM EXAM	6	
14-Feb	Open Channel Flow	7	Lab 4 Intro
16-Feb	Hydraulic Control Structures	8	
21-Feb	Soil Conservation and Sediment Budgets	9	Lab 4 Due, Lab 5 Intro
23-Feb	Soil Conservation and Sediment Budgets	9	
28-Feb	Hydrology of Forests, Wetlands, Cold Climates	10	Lab 5 Due, Lab 6 Intro
1-Mar	Hydrogeology	11	
6-Mar	Human Impacts on the Hydrologic Cycle	12	Lab 6 Due, Lab 7 Intro
8-Mar	Human Impacts on the Hydrologic Cycle	12	
13-Mar	Fundamentals of RS and GIS for Hydrologic Apps	13	Lab 7 Due
15-Mar	Fundamentals of RS and GIS for Hydrologic Apps	13	
20-Mar	FINAL EXAM, 8:00 am, Grad Projects Due		

### LABS:

**Lab 1 – Precipitation (worth 5% of total grade)**

**Lab 2 -- Evaporation Lab (worth 5% of total grade)**

**Lab 3 -- Runoff Lab (worth 10% of total grade)**

**Lab 4 -- Runoff Modeling Lab (worth 5% of total grade)**

**Lab 5 -- Reservoir Storage Lab (worth 5% of total grade)**

**Lab 6 -- Dam Impacts Lab (worth 5% of total grade)**

**Lab 7 -- Tragedy of the Commons Lab (worth 5% of total grade)**