

GEOG 492 Hydrology (Spring 2008)

Place/Time: Lecture: DH 116 / T Th 2:00 - 2:50 PM
Lab: DH 221 **Th 12:00PM – 1:50 PM**
Professor: Dr. Wei Luo (email: wluo@niu.edu: 753-6828)
Office hours: **T Th 11:00 am – 12:00 pm** (DH 120)
T.A.: Marius Paulikas, 753-6833 (DH 208)

I. Course Description

This course introduces the fundamental physical principles that are necessary to understand the occurrence, distribution, and circulation of water near the Earth's surface. A qualitative understanding of the hydrological phenomena will be enhanced by a quantitative examination of the physical processes involved in the hydrological cycle. The course will provide an introduction to hydrological processes (what, where, how, and why) and data acquisition and analysis. The purpose of the laboratory is to reinforce the principles and applications introduced in lecture and to be familiar with computer modeling tools in hydrology.

II. Course objective

After successful completion of this course, the students should be able to:

- apply physical laws to solve basic hydrologic problems.
- use common computer modeling tools to simulate simple hydrologic processes

III. Course Materials

Text: Hornberger, G. M., Raffensperger, J. P., Wiberg, P. L., and Eshleman, K. N., *Elements of Physical Hydrology*, 1998, The Johns Hopkins University Press.

Reference: Manning, J. C., *Applied Principles of Hydrology*, 3rd Ed., Prentice Hall, 1997, Upper Saddle River, New Jersey. (If you haven't had GEOG 303, this is a good text for qualitative understanding of hydrological processes.)

S.L. Dingman, *Physical Hydrology*, 2nd edition, Prentice-Hall, Inc., New Jersey, 646 pp., 2002

Course web site: <http://webcourses.niu.edu> The BlackBoard course website is an empowering learning tool for you. You will need to use this web site to download lecture notes, to track your grades, to obtain homework and announcement, to communicate with your classmates and me, and much more. If you haven't used it before, please visit the website and click on Student Help button for more information.

IV. Warm-up Exercise, Homework Assignments, Computer Lab Exercise, and Field Trip

These are designed for you to understand the concepts and theories covered in lectures better. Problem sets will be handed out approximately every other week. They should be completed independently. Attending all labs and field trip are mandatory.

The online warm-up (WU) exercise is designed to engage students in active learning. Each WU exercise will be composed of a few (1-4) short questions related to the content that will be covered or to the content of the immediate previous lecture. I will adjust my teaching based on your answers and your needs. It is **due 1:00 PM on Tuesday** weekly. After the deadline, you won't be able to access that warm-up exercise. It should only take about 10-15 minutes at most to complete it. For the questions related to

the content that will be covered, the grading will be based more on **your effort** and less on the correctness of your answer. In other words, if you make your best effort to answer the questions, you will get the full credit even if you are wrong. For the questions related to the immediate previous lecture, which will be mostly multiple choice questions, they will be automatically graded based on the correctness of the answer. The warm-up exercises account for **5% of your course grade**. *You may miss one warm-up exercise without affecting your grade.* Completing the warm-up exercises on time will not only ensure that you get the 5% of your grade, but also improve your understanding of the lecture material and thus help you in your exams. In fact, previous experiences show that students who keep up with their warm-up exercises in general also do well on their exams.

V. Exams

One mid-term examination and one final examination will be given. Each exam will cover the material presented in class, and the associated readings, and the lab exercises. There will be a review session before each exam. While the final is not comprehensive, you may be asked to utilize and apply concepts learned earlier in class. **There will be NO make-up exams after the scheduled exams are given. Should you have a schedule conflict, please talk to me well BEFORE the exam date. There will be NO extra credit.**

VI. Grading

Your course grade will be based on warm-up exercise (5%), the problem sets (20%), labs (25%), and mid-term (25%) and final exams (25%). Late works are strongly discouraged and will be deducted 15%-50%. No work will be accepted once the graded works are returned. Your total score will be calculated based on the following formula:

$$(wu1 + wu2 + \dots)/(WU1+WU2+\dots)*5\% + (ps1 + ps2 + \dots)/(PS1 + PS2 + \dots)*20\% \\ + (lab1 + lab2 + \dots)/(LAB1 + LAB2 + \dots)*25\% + m/M*25\% + f/F*25\%$$

where upper case represents the maximum possible score and lower case the actual score you get. The total score is then converted to letter grade according to the following table:

<u>Total Score</u>	<u>Course Grade</u>
≥ 90 %	A
80-89 %	B
70-79 %	C
60-69 %	D
<60 %	F

A total score very close to the break point (e.g., 89.9) *may* be elevated *only if* there is a natural breaking/clustering in the score distribution at the instructor's discretion.

VII. Policy

Each student is expected to work independently on all exams and problem sets. You may consult others on labs. However, you must go through the steps yourself in order to master the software. If you have questions, seek your TA or myself during our office hours, or make an appointment. I also encourage you to attempt the example problems at the end of each chapter, and the interactive multiple choice questions on the CD accompanying your textbook. The exams may consist of multiple choice questions, problems, and/or definitions.

The due date and time for each homework and lab will be clearly stated. Late works are strongly discouraged and will be penalized. Late works will not be accepted after the graded works are returned.

Besides the official lab hours, there will be open lab hours posted outside the lab door.

VII. Miscellaneous Tips

1. Ask questions. Ask in lecture, in lab, during office hours, if you see me walking across campus... If you are having difficulties with any portion of the class, you should talk to me as soon as possible so we can correct the situation. Do not wait until the end of the semester to bring problems to my attention.
2. I encourage you to visit my office at least once this semester during the office hours or make an appointment. The office hours are set aside for you. I am here to help you and to make sure that you learn and achieve the objectives of this course.
3. The exercises and labs are designed and selected to help you understand the theories and concepts better. Historically students find it extremely difficult to succeed in this course if they do not attend class regularly, take good notes, and complete all exercises and labs.
4. Please do not feel frustrated if you make mistakes when using the software because that's just part of the learning process.
5. If you have a documented disability and wish to discuss academic accommodations, please contact me privately as soon as possible so that we can make suitable arrangements. If you have any questions or need further help, please contact the Center for Access-Ability Resources (CAAR).

VIII. Tentative Schedule*

Week of	Topics	Lab or Problem Set (PS)
1/15,17	Introduction, the water cycle, basic statistics, dimensions and units	PS #1
1/22,24	Structure and property of water	Lab1: Excel Introduction
1/29,31	Catchment Hydrology: land-atmosphere interaction (precipitation, interception, evapotranspiration)	PS #2
2/5,7	Catchment Hydrology: land-atmosphere interaction (precipitation, interception, evapotranspiration)	Lab2: Explore with MatLab Notebook
2/12,14	Principle of Fluid Dynamics	PS #3
2/19,21		
2/26,28	Open Channel Hydraulics	Lab3: Watershed delineation
3/4,6	Open Channel Hydraulics	Lab 4: Specific Energy
3/11,13	<i>Spring Break, no class</i>	
3/18,20	Review (3/18) & <i>Midterm (3/20)</i>	
3/25,27	Catchment Hydrology: Streams and Floods	Lab5: TBD
4/1,3	Catchment Hydrology: Streams and Floods	PS #5
4/8,10	Groundwater Hydrology and Hydraulics	Lab6: TBD
4/15,17	Water in Unsaturated Zone	Stream Gage Field Trip (4/17)
4/22,24	Catchment Hydrology: Hillslope-Stream Continuum	PS #6
4/29,5/1	Catchment Hydrology: Hillslope-Stream Continuum	Lab7: TBD
5/6, 8	Connections and review	PS #7
5/13	Final: Tues. May 13, 2-3:50 p.m.	

*The exact contents that will be covered are subject to change. Students are responsible for all updates announced in class and on BlackBoard.