

**Purdue University
Department of Agronomy**

AGRY 598W Advanced Topics in Hydrology, Spring 2007

Room 102, Biochemistry Building, TTh 10:30 - 11:45 am

Course Description: This course is designed to serve as an advanced course in surface water hydrology with a specific focus on hydrologic response in urban and urbanizing areas and analysis techniques for identifying hydrologic change. There are no prerequisites, although a general background in earth sciences or engineering will be beneficial, as is STAT 511 or an equivalent. As such, this class should be of interest to graduate students in a variety of disciplines, including Agronomy; Forestry and Natural Resources; Earth and Atmospheric Sciences; and Agricultural Engineering.

Course Objectives:

- Become familiar with the unique aspects of land surface hydrology in urban environments.
- Develop a suite of research tools to analyze hydrologic change in response to land cover and land use change.
- Refine written and oral communication of research results.

Instructor Information:

Instructor: Dr. Laura Bowling

Office: 3-337 Lilly Hall (3rd floor, 300 hallway)

Phone: 494-8051 (office), 567-1123 (home)

E-mail: bowling@purdue.edu

Office Hours: Thur. 1:00 - 3:00 pm; Fri 9:30 - 11:30 am

Availability: I have an "open door" policy: if my office door is open, feel free to stop by with any questions about the course, homework or readings. However, I am often not in my office and email is often the best way of contacting me. Questions regarding assignments will be most efficiently answered during established office hours.

Text: Readings from a variety of sources (book chapters and journal articles) will be distributed in class and via WebCT VISTA. Book chapters will be taken from the following references:

Bras, R.L., 1990, Hydrology, An Introduction to Hydrologic Science, Addison-Wesley Publishing Company, Reading, Mass.

Lazaro, T.R., 1990, Urban Hydrology A Multidisciplinary Perspective, Technomic Publishing Company, Inc., Lancaster, PA.

Linsley, R.K. 1982, Hydrology for Engineers, McGraw-Hill Inc, New York.

Maidment, D.R., 1993, Handbook of Hydrology, McGraw-Hill Inc, New York.

Hall, M.J., 1984, Urban Hydrology, Elsevier Applied Science, New York.

Class Website: AGRY 598W has a website on WebCT VISTA. Point your browser to <http://www.purdue.edu/ecourses>; click on the large key that says "Log on to WebCT Vista"; log on using your Purdue University Career Account username and password.

The website will primarily be used to provide copies of class lecture notes, assignments and supplemental readings. Grades will also be posted on the site. Changes to the syllabus and other announcements will also be posted on the site, so in particular if you miss class, be sure to check the site for any announcements.

Homework Policy:

Honesty Policy: Students may consult with one another regarding completion of the assignments; however each student is expected to turn in his or her own work. Any outside sources used must be properly referenced in the style used by major journals in your field of study. Academic dishonesty (i.e. plagiarism) will result in a zero grade for the assignment, possible failure of the course, and reporting of the incident to the Dean of Students for further action.

Reading Assignments and Class Participation: Reading assignments will either be handed out in class or posted on the class website. The assignments should be read prior to class and you should come to class prepared to discuss the readings.

Final Project:

Instructions for the research project will be distributed separately. In general, the project should cover some aspect of hydrology and environmental change and should make use of one or more of the data analysis techniques covered in class. Results should be written up as a 10 - 15 page paper in an appropriate journal format and will be presented to the rest of the class during the final week of the semester.

Grading, Testing, and Student Evaluation Procedures:

There will be no formal examinations for this class. There will be four assignments to illustrate the analysis methods learned in class and a personal research project to be turned in at the end of the semester (during exam week). Your overall grade will be based on the following point distributions. The total number of points is subject to change, but should not be substantially different.

| <u>AGRY 598 Grading System</u> | <u>(Approximate Point Distribution)</u> |
|---------------------------------------|--|
| Assignments (4) | 200 points |
| Research project | 200 points |
| Total | 400 points |

Course grades will be assigned according to the percent of the total points earned. Students who earn 90% of the total points in the course will be guaranteed to receive an A, 80% a B, 70% a C, 60% a D, and less than 60% an F. The instructor reserves the right to lower the cut off percentages for grades.

Preliminary Class Schedule

| Week | Tuesday Lecture Topic | Thursday Lab Topic | Assignments (due on Thursdays) |
|------|--|-----------------------------|-----------------------------------|
| 1 | Intro. to urban hydrology | Hydrologic time series | |
| 2 | Historic patterns of urban growth | Exploratory data analysis | |
| 3 | Quantifying urban extent | Tests for shifts and trends | |
| 4 | Guest lecture: Pijanowski | | Project title & abstract |
| 5 | Runoff generation | Flood frequency analysis | Assignment 1 |
| 6 | Streamflow and spatial scale | | |
| 7 | Guest lecture: Warnemuende | | |
| 8 | Impact of urbanization on streamflow | | Project introduction |
| 9 | | | |
| 10 | Spring Break | | |
| 11 | Land surface water and energy balance | Paired catchment statistics | Assignment 2 |
| 12 | Urban meteorology | | Project methods |
| 13 | Water quality | | |
| 14 | Guest lecture: Lee | Streamflow statistics | Assignment 3 |
| 15 | Indicators of stream ecosystem health | | |
| 16 | Oral presentation of research projects | | Assignment 4 |

The above schedule is subject to change in the event of extenuating circumstances.