Instructor Information:

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Office Hours: Anytime by appointment. Call/email to confirm availability.

Required Textbook: We will be using course handouts, Internet sources, and public domain computer programs and associated documentation, available from the Internet. Much of the course material will be available on the course web page.

Course Objectives:

Urban Water Systems is the integration of water delivery, wastewater collection, drainage systems, and associated treatment components in urbanizing areas. Traditionally, these topics are mostly examined in isolation. However, the growing field of Urban Water Systems recognizes and studies the obvious connections between these areas as an integral science. In addition, it is difficult to separate surface and groundwater elements of water sources and disposal, although most academic approaches examine these in isolation. Obviously, this course cannot cover all these topics in detail, but will attempt to examine the relationships between them, and areas that have not received adequate attention in prior classes.

We will review and use three modern design models during this class:
- WinSLAMM will be used to investigate stormwater sources, reuse, and control options,
- EPANET will be used to investigate domestic water supply system designs affected by water conservation options and reuse, and
- PCSWMM will be used to investigate drainage systems for both stormwater and sanitary wastewater, especially considering the effects of reduced flows due to reuse and water conservation in the service areas.

The use of these models will enable us to quantify the benefits of non-traditional options (such as wastewater reuse, de-centralized treatment, water conservation, etc.) on urban water infrastructure. These models are possibly the most popular models currently being used for the design of water supply systems, stormwater collection systems, and for sanitary wastewater collection systems. These models have also been used for many years (most had previous DOS versions) and employers are very interested in applicants having some exposure and experience with these models. These models are also all open-coded and in the public domain, plus have excellent technical support. The models and documentation are freely downloadable, and Internet user groups exist for the models that offer great assistance. All of the models are new versions and are windows-based, enabling rapid access to basic and advanced model features. SWMM is still DOS-based, but the version we will use has a Windows front end, with many advanced features. The newest version of SWMM is just now available and we will also review its features during the class.

Typical assignments will include a simple “hello world” application, in addition to a more advanced application. We will examine the technical basis of the models, the basic model alternatives, and the selection of the most suitable options for common conditions.

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There will be two term papers prepared during the class. The first paper will be on a topic from the general areas of water use and reuse options, or human health risk assessments. This paper will be due on the 5th week of classes (September 17, 2003). The second paper will be on a topic selected from the general areas of surface and groundwater interactions or water conservation, and will be due on the 10th week of classes (October 22, 2003). Each paper will be about 10 pages in length (typed) and will be a review of the literature for a relevant topic in these categories. Each paper will be extensively documented with literature citations (use both the library and Internet sources). You will also make a 10-minute presentation to the class on your topic on the day they are due. The paper titles and brief outline, plus a preliminary literature citation list will be due to me no later than 2 weeks before the papers are to be handed in, for my approval (you are encouraged to submit these earlier, if possible).

Each of the three main models will also have a simple assignment demonstrating how you can set up and run the model. We will prepare simple “hello world” example model runs in class, and each student will then apply the model to a local area and investigate relevant class topics through a simple sensitivity analysis.

The class will be divided into two teams and each will prepare a final project that will integrate the course material, based local situations. The final exam will consist of presentations by each team.

Prerequisite by Topic:
Basic water resources/hydrology/hydraulics.

First Day of Class: August 20, 2003
Last Day of Class: December 3, 2003
Final Exam: Friday, December 12, 2003; 3:30 to 6:00 PM

Grading:
Approximate grading:
Assignments for this class will consist of 3 computer program projects (30%), two research papers (30%), plus the final team project (40%). If you complete an assignment as given, and it is correct and presented in a professional manner, you will have done what is expected and will receive an above average grade. You will receive an “excellent” grade only for work of an outstanding caliber.