

Watershed Engineering

BEE 4730

Instructor M. Todd Walter (mtw5, Riley-Robb 222, 607-255-2488)

TA Allison Truhlar (amt94)

Text Water Resources Engineering, Chin, Prentice Hall (2nd or 3rd ed.)
(highly Recommended)

References on Reserve *Design of Small Dams*, US Dept of Interior, Bureau of Land Reclamation
Open Channel Hydraulics, Chow

Lecture/Lab Tuesday and Thursday 10:10 – 11:00 am / Thursday 1:25 - 4:25 pm

Course Description The purpose of this course is to teach basic design and analysis *as practiced* for water control and nonpoint source pollution prevention. We will discuss the origins of design approaches including their theoretical bases but this is not a theory course. Many design methods have an empirical basis and simplifying assumptions, generally because extensive data requirements for more complex physically robust analyses are not readily available.

The first two weeks of this course cover applied hydrology and for some of you these initial weeks will be a partial review, but for others this will be a relatively intense period.

Most of the course will be dedicated to practicing applied design. There are two aspects receiving focused attention: 1) applying scientific and engineering principles and methods to create designs and 2) presenting work in concise, organized reports. Most assignments will be representative of real-life engineering problems and will involve as much hands-on experience as possible.

Most Thursday afternoon sessions will be used for problem-solving, data gathering, or field trips. Although the session is scheduled from 1:25-4:25, often only the first 1 to 1.5 hours or so will be used, except for the off-campus field trips which will generally require the whole period.

For this course you will be graded on both your technical ability and the presentation of your ideas. ***Homework will be due 1 week after it is assigned. For each day late, 10% will be subtracted from your grade up to one week whereby the assignment will no longer be accepted.***

Grade 50% Homework Assignments and Pop Quizzes
15% Mid-term Exam or Design Project: **Due: TBA**
25% Special Design Problem: **Due: TBA**
10% Presentations

Tentative Schedule

Week	Lec.	Topic (see website for suggested reading)	Lab
1	1	Course overview	
Engineering hydrology			
1	2	Risk assessment and	Field trip - Local watershed engineering
2	3	frequency analysis	
2	4	Storm runoff estimation	Field trip - Plantations, Level-loop surveying
3	5	Runoff reality check	
3	6	TBA	Watershed delineation and runoff calculation
4	7	Intro GIS	
4	8	Intro GIS	Computer lab - Intro GIS
Hydraulic design			
5	9	Fluid mechanics/hydraulics	
5	10	Open channel hydraulics	Field trip - Cascadilla Creek lined channel
6	11	Vegetated waterways	
6	12	Control Structures; Pipe Spillways	Field Trip—Cornell vegetated waterway
7	13	Drop Spillways and Chutes	
7	14	Hydraulic Outlet Design	Field trip - local culvert
8		FALL BREAK	
Water quantity control			
8	15	Flood Control	Optional field trip - Cornell Plantations flow control structures. NPS project assigned
9	16	Unit Hydrograph	
9	17	Level Pool Flood Routing	Field trip - Dyrden, Virgil Ctr. Flood control.
10	18	Water Supply Reservoirs	
10	19	Hydrological Budget	Field trip - Stream Restoration
Nonpoint source pollution			
11	20	NPS Project Presentations	
11	21	SPS Project Presentations	Exam, final project announced
12	22	Pollutants, Sources, and Flow Paths	
12	23	Real Runoff and Riparian Buffers	Field trip – Campus, Rain gardens and detention basins
13	24	Determining NPS Pollution Loads	
13	25	Sediment Control & BMPs	Work on final project
14	26	Non-Structural NPS Pollution Controls	
14		THANKSGIVING	
15	27	Final Presentations	
15	28	Final Presentations	Field trip - TBA