

ESM 224 Syllabus

Course Objective

Water Quality in streams, rivers and lakes depends to a large extent on land-use and the corresponding watershed processes. The objective of the course is to provide students with a better understanding of the science and management issues related to managing a watershed in a sustainable manner. The course will cover indicators of water resources, elements of a watershed management plan, tools to understand the various components of the watershed and perform analysis of sustainability, and possible solutions to supply and water quality problems within the watershed. The course requires significant student participation in class discussions and final presentations, and a weekly 2-hour session in the Student Computing Facility. Prerequisites: ESM 202, 203. Strongly recommended: ESM 222, 234 or 235, ESM 263. Recommended: ESM 223, ESM 225.

Reading materials:

Provided online in the GauchoSpace course website

Assignment:

Develop a Watershed Management Plan for the watershed of your choice, working in teams of 2 or 3. Each week beginning with Week 3 you will provide a deliverable, as indicated in the GauchoSpace course website. There is also a final oral presentation of your plan during finals week at the time scheduled for our "final". You will receive feedback weekly on your deliverables, and your final grade will be based 80% on your compiled written Watershed Management Plan and 20% on your oral presentation.

Lectures:

Note that each case study is covered in one lecture, except cases 4 and 5 which are combined into one lecture.

Lecture 1 - Introduction to Water Sustainability

Lecture 2 - Water Policy related to Watershed Management

Lecture 3 - Elements of a Watershed Management Plan

Lecture 4 - Water Supply and Demand

Lecture 5 – Improving Water Management

Lecture 6 – Quantifying the Energy-Water Nexus

Case 1 – San Diego Water Supply

Case 2 - Santa Ana Watershed

Lecture 7 - Agricultural Loads & BMPs

Lecture 8 - Urban Loads & BMPs

Lecture 7 & 8 - Urban BMP Design

Case 3 – Napa Nutrient Management

Lecture 9 - Cost Optimization

Case 4 - Santa Clara Watershed Nutrient Management

Lecture 10 - Selecting a watershed model

Case 5 - San Cristobal Chiapas Watershed Management Plan

Case 6 - Tijuana Watershed Management Plan

Lecture 11 - WQ protection = Real Costs

Case 7 - Lower St Johns River FL - Nutrient Management Plan

Lecture 12 - Sources of Uncertainty

Lecture 13 - WQ Markets

Lecture 14 - Summary