HYD 274
Practice of Groundwater Flow & Transport Modeling

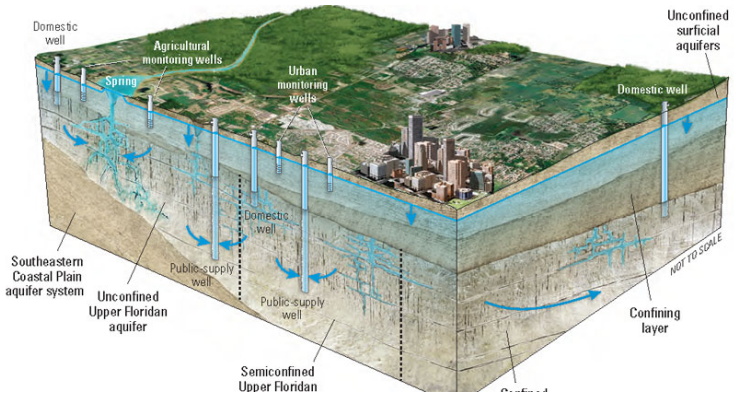
Spring Quarter, 2020
Hydrologic Sciences / Department of Land, Air, and Water Resource
University of California Davis

Course Instructor: Thomas Harter, Ph.D., 125 Veihmeyer Hall, ThHarter@ucdavis.edu
http://groundwater.ucdavis.edu/gwmodelingcourse.htm

Credits: 3 (letter graded)
Time: Lecture-Lab Wednesday Morning 9-12 (Spring 2020: possibly 3x 1 hour)
~~PES Computer Lab (PES 1137)~~ SPRING 2020: ONLINE

In this hands-on laboratory course, students learn how to do develop their MODFLOW/numerical groundwater modeling projects for a professional (consulting, applied research) context. The course introduces the practical aspects of groundwater modeling and modeling projects in an intuitive and comprehensive manner. The course focuses on hands-on experience with the planning, preparation, execution, presentation, and review of a modeling project. We briefly review the methods, assumptions, and limitations of groundwater models – students are expected to take or have taken more rigorous numerical methods courses (most students typically take this course in conjunction with HYD 269). We will learn and use MODFLOW, MODPATH, and MT3D within the Groundwater Vistas GUI and review and understand the underlying physical concepts in the context of real world applications (site to basin scale). As a class project, students will familiarize themselves with one additional groundwater modeling software (e.g., IWFM, PARFLOW, Analytic Element Method, IGW, FEFLOW, MikeSHE, HYDRUS). At the end of the course, participants should be able to understand and actively engage in planning, implementation, supervision, and/or review of groundwater modeling projects, particularly MODFLOW projects. The course is complementary to and well suited as an add-on to HYD 269, ECI 144, ECI 289, and ECI 272A/B/C. This course specifically focuses on the practice of actual model building.

Course Topics/Syllabus:



- overview of groundwater modeling software / Intro to MODFLOW
- data collection and preparation
- model grid design
- boundary conditions / MODFLOW packages
- transient flow modeling
- sensitivity analysis, model calibration and verification
- capture zone analysis
- contaminant transport modeling
- geostatistical modeling

In addition to class attendance, students are expected to independently:

- prepare a short project proposal
- prepare and implement a computer modeling project (can be done jointly with HYD 269)
- give an in-class project presentation about their project (jointly with HYD 269)