



SEATS AVAILABLE

HYD 144 and EBS 144 (cross-listed):

Groundwater Hydrology (4 units)

- **An Interdisciplinary Introduction** -

In 2022-2023, Environmental Engineering students take HYD 144 in lieu of ECI 144 Groundwater Systems Design (not offered) to meet [Environmental Engineering Upper Division degree requirements](#). Civil Engineering majors may apply through the [course substitution process](#).

Note: HYD 144/EBS 144 will only be taught in the Fall (not in Winter when ECI 144 would normally be offered).

GE credit: QL, SL, VL, WE

Recommended (but not required) prerequisites:

Mathematics 12, or 16B or 21A or any equivalent; Hydrologic Science 103 or Engineering 103.

Lecture MWF 12-1 (All Sections)

Discussion W 1-2/2-3/3-4/4-5/5-6/6-7 (Sections 1 – 6, respectively)

Instructor:

Thomas Harter, ThHarter@ucdavis.edu, <http://groundwater.ucdavis.edu>

This course takes an interdisciplinary, holistic approach to understanding groundwater resources and appeals to students from across environmental, engineering, policy, agricultural, and earth sciences. We explore groundwater through the lens of various systems: as an economic, geographic, geologic, physical, chemical, legal/regulatory, and management system. Topics covered include: global role of groundwater resources in society; groundwater in the hydrologic cycle; geology of groundwater; global, US, and California geography of groundwater; physical measures of groundwater occurrence and flow; water balance; modeling groundwater flow; principles of well construction; aquifer tests; groundwater quality; contaminant transport and monitoring; groundwater law; water quality regulations; sustainable groundwater management. The course provides useful skills for careers in consulting, academia, natural resources management, industry, agriculture, law, government, public administration, and with NGOs. The course provides a foundation for the UCD groundwater course series (e.g., ECI 144, HYD 134, HYD 150, HYD 274, ECI 261, ECI 289I).

Syllabus:

0th Week – **Groundwater and Society in a Global Context**

1st Week – **Groundwater as Hydrologic System:** Hydrologic Cycle, Groundwater-Surface Water Interaction, Water Budgets

2nd Week – **Groundwater as Geologic and Geographic System:** Geology of Groundwater, Geography of Groundwater Occurrence and Use

3rd Week – **Groundwater as Physical Flow Systems:** Groundwater Flow Principles: Porosity, Hydraulic Conductivity, Head, Darcy's Law

4th Week – **Groundwater as Physical Flow Systems:** Physical Principles of Groundwater Flow; Developing a Flow Equation

5th Week – **Groundwater as Engineering System:** Water Well Design and Construction (FRIDAY is midterm!!)

6th Week – **Groundwater as Regional Flow System:** Applications of the Flow Equation: Flow to Wells; Regional Groundwater Flow Systems; Capture Zone of Wells. (NO WEDNESDAY CLASS)

7th Week – **Groundwater as Geochemical System:** Water Chemistry Fundamentals, Groundwater Quality (Guest Lecturer: Dr. Steve Deverel)

8th Week – **Groundwater as Geochemical System:** Contaminant Hydrogeology (NO FRIDAY CLASS)

9th Week – **Groundwater as Legal and Regulatory System:** Groundwater Rights, Groundwater Quality Regulations

10th Week - **Groundwater as Management System:** Principles of Sustainable Groundwater Management (Quantity and Quality)