**USGS Water-Quality Principles (UDT)**

**Course No.: USGS-OED-QW1022-TEL**

Course Coordinator: Franceska Wilde [fwilde@usgs.gov](mailto:fwilde@usgs.gov), (703) 648-6866

**Course Dates: January 9 – February 9, 2012. Registration through DOI Learn is now open. This Web-based course is self-paced within the constraints of the dates shown.**

**Instructors:**

**Students are assigned an instructor with whom they engage in at least two WebEx sessions and who provides guidance and answers questions throughout the course, as needed. The instructors for this course offering include Dave Mueller, Water-Quality Specialist, Central Water Science Field Team; Tony Paulson, Supervisory Hydrologist, WA WSC; Roger Lee, Geochemist, USGS (retired) now with Sims and Associates, LLC; and Frančeska Wilde, Hydrologist, Office of Water Quality.**

**Description**

“Water-Quality Principles” combines online course materials with instructor-facilitated guidance. The course provides an introduction to the scientific principles, concepts, and practices that underlie the development and execution of water-quality studies. Included is an overview of Earth’s environmental systems and how their interactions affect the quality of natural water resources, and an undergraduate-level review of inorganic, organic, and isotope chemistry; aquatic ecology; and environmental microbiology. In addition, the course covers the application of quality-assurance and quality-control concepts and strategies in project work; concepts in evaluating the sources, fate, and transport of contaminants in aqueous systems; and introduces interpretive methods commonly used for analysis of water-quality data.

QW1022-TEL was developed using Adobe® Acrobat Connect Professional through the Office of Organizational and Employee Development's (OED) Technology Enabled Learning (TEL) Program. Contact Tj Lane [tjlane@usgs.gov](http://oedbreeze.cr.usgs.gov), (303) 445-4677 or Patty Gonwa [pmgonwa@usgs.gov](mailto:pmgonwa@usgs.gov), (303) 445-4680 if technical problems arise while taking the course.

Course Objectives

This course was developed primarily for personnel who are or will be engaged in the study and collection of water-quality data, and who either have little academic background in one or more of the topics covered or who want to refresh knowledge. By the end of this course, the student should be able to: (1) define key terms of the water-quality discipline; (2) describe the effects of hydrologic, biologic, geologic, and atmospheric systems on water quality; (3) enumerate the basic principles, properties, and structures of inorganic, isotope, and organic chemistry; (4) list examples of some major- and trace-ion cycles, field-measured water properties, and environmental and pathogenic microorganisms; (5) describe the structure of aquatic ecosystems and the role of indicator species for habitat assessments; (6) list types and functions of quality-control practices; (7) demonstrate use of common methods for analysis of water-quality data; (8) present an analysis of an assigned water-quality problem.

**Course Requirements and Content**

There are no academic requirements, but an exposure to high school or college chemistry is helpful.

After requesting the course in DOI Learn and receiving the necessary supervisory approvals, **the student must e-mail** [GS\_OED-TEL@usgs.gov](mailto:GS_OED-TEL@usgs.gov) **to obtain an ID and password on OED's dedicated TEL server and receive further instructions on how to access the course.**

This course requires completion of 14 lessons (see below) that include exercises related to analysis of an environmental case study and development of afinal student presentation. The lessons are completed online at the student’s convenience, but within the time constraints of the start and end dates. After completing the requirements for each lesson, including the final student presentation, the Course Coordinator ensures that the steps are taken to show a “completed” status on the student’s transcript in DOI Learn.

Lesson

1. Fundamentals of Water Quality and Study Design
2. Environmental Systems and the Hydrologic Cycle
3. Basics of Aqueous Chemistry
4. Governing Principles of Aqueous Systems
5. Major Ions and Field-Measured Properties
6. Trace Elements
7. Reduction-Oxidation Chemistry
8. Environmental Organic Chemistry
9. Environmental Microbiology
10. Aquatic Ecology
11. Environmental Isotopes
12. Concepts in Quality Assurance and Quality Control
13. Interpretive Methods
14. Case-Study Discussion and Student Presentation