

PONTIFICIA UNIVERSIDAD CATÓLICA DE CHILE  
COLLEGE OF ENGINEERING  
DEPARTMENT OF ELECTRICAL ENGINEERING  
ABET COURSE SYLLABI

**ICH3314 WATER QUALITY**

- Credits and contact hours:** 10 UC credits/ 10 hours (3 h. Lectures; 1,5 h. Assistanship and 5,5 h. Independent learning experiences)
- Instructor's name:** Pablo Pastén G.
- Course coordinator's name** Pablo Pastén G.
- Textbook:** Snoeyink & Jenkins. Water Chemistry. Wiley, 1980.  
Benjamin M. Water Chemistry. McGraw-Hill, 2000.  
Scientific articles on ISI Web of Knowledge
- Course Catalog Description:** The sustainability of human activities and their interaction with natural systems depends strongly on water quality aspects. The functioning of cities, the development of industrial projects, agriculture and mining activities require water in quality and quantity. Water quality is a key aspect for designing public infrastructure, assessing and management water resources, design of environmental remediation and proposing prevention measurements that assure sustainability and environmental viability of development projects. This class seeks that the student build conceptual and quantitative models of the physical, chemical and biological processes that control water quality, and to familiarize with the use of parameters and analytical technics for their characterization. Given that in the next few years we will need to face important challenges in water quality, this class also introduce the student to problems, tools, and science of emergent issues in water quality.
- Prerequisite Courses:** ICH 2304 Environmental Engineering
- Co-requisite Courses:** None
- Status in the Curriculum:** Required
- Course Learning Outcomes:**
1. Identify, understand and analyze the physical, chemical biological foundations that control water quality in natural and engineered systems.
  2. Build and apply simple conceptual and quantitative models of the processes of the processes that determine water quality in rivers, lakes, sediments and aquifers.
  3. Familiarize with the use of traditional and emergent tools for water quality chemical analysis.
  4. Describe and analyze traditional and emergent water quality issues

**Relation of Course to ABET  
Criteria:**

- b. Design and conduct experiments: analyze and interpret data
- c. Design a system, component, or process
- e. Identify, formulate, and solve engineering problems
- g. Effective communication
- k. Techniques, skills, and modern tools for engineering practice.

**Topics covered:**

1. Water quality parameters
2. Thermodynamics of water quality
3. Acid base reactions
4. Complexation reactions
5. Precipitation/dissolution reactions
6. Redox reactions
7. Reactions catalyzed by microorganisms.
8. Assessment of water quality and the processes controlling it
9. Semester applied experimental/field basic project