

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

**ICH3394 WORKSHOP OF ENVIRONMENTAL TREATMENT AND  
REMEDATION**

**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:** Ignacio Toro, Gonzalo Pizarro, Pablo Pastén, Ignacio Vargas, Carlos Bonilla

**Course coordinator's name** Marco Alsina

**Textbook:** Rittmann, B. & McCarty, P. Environmental Biotechnology: principles and applications. McGraw Hill, 2002.

**Course Catalog Description:** Environmental control and remediation projects require the collaboration and integration of specialists across different disciplines needed to pursue the specific objectives of projects. Each project poses particular challenges associated to the biogeographic environment and environmental quality standards that are required to comply. This course integrates the educational outcomes from other classes included in the student's program through the group work on a designated project throughout the semester. The project is a real one or an adaptation of a real project. It includes steps like identification of needs, design criterias, alternative technologies, environmental implications, dimensioning of unit operations, interpretation of data, design and performs experiments in the lab or field as needed.

**Prerequisite Courses:** ICH 2374 Principles of Physical-Chemical treatment / ICH2384 Principles of Environmental Biotechnology

**Co-requisite Courses:** ICH 3384 Environmental Biotechnology

**Status in the Curriculum:** Required

**Course Learning Outcomes:**

1. Identify, dimension and systematize the needs that trigger a project.
2. Identify alternative preliminary solutions and pre select according to an analysis of advantages/disadvantages from the technical, environmental, economic, and safety perspective.
3. Define specific design criteria for alternative solution and dimension unit operations.
4. Conceptual and quantitative modeling of the expected behavior of proposed solutions, identifying improvement opportunities..

5. Effective communication through written material, visuals (drawings, figures, diagrams, graphs, etc.), oral presentations, organizing the messages to enhance understanding and decision making involved in the process.
6. Work in teams with different responsibilities towards achieving a solution to an environmental problem, considering specific characteristics of each project.

**Relation of Course to ABET  
Criteria:**

- b. Design and conduct experiments: analyze and interpret data
- c. Design a system, component, or process
- d. Multidisciplinary teams
- e. Identify, formulate, and solve engineering problems
- f. Professional and ethical responsibility
- g. Effective communication
- i. Recognition of the need for, and an ability to engage in life-long learning
- j. Knowledge of contemporary issues
- k. Techniques, skills, and modern tools for engineering practice.

**Topics covered:**

1. Project need and design criteria
2. Dimensioning of environmental technologies required to meet project objectives.
3. Conceptual and quantitative modeling of solutions
4. Optimization of alternatives considering environmental, technical, economic and safety dimensions.
5. Introduction to preparation of technical economic materials for biddings.
6. Assessment and improvement of solutions