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

ICH2304 ENVIRONMENTAL ENGINEERING

Credits and contact hours: 10 UC credits/10 hours (3 h. Lectures; 1,5 h. Assistanship; 5,5 h. Independent learning experiences)

Instructor's name: Carlos Bonilla (Sec 01), Ignacio Vargas (Sec 02)

Course coordinator's name Carlos Bonilla

Textbook: Henry JG, Heinke GW. Environmental science and engineering (2nd ed.). London, Prentice-Hall International, 1996. 778 p.

Course Catalog Description: This course explores the fundamental nature of environmental systems, with emphasis in current environmental problems, their causes, effects, and engineering solutions. With a technical and quantitative approach, the course introduces engineering students to environmental problems. The course is divided into three main sections: the causes of environmental problems, the scientific basis to understand them, and the engineering techniques and methods to control them.

Prerequisite Courses: QIM 100A (or QIM100) General Chemistry

Co-requisite Courses: MAT 1640 Differential Ecuations

Status in the Curriculum: Required

Course Learning Outcomes: The aim of the course is to introduce engineering students to the interdisciplinary study of environmental problems, their causes, concerns, and control techniques. In this course emphasis is placed on the practical application of environmental science and engineering theory to a comprehensive environmental control and regulation. After completing the course, students will be able to:

1. Identify and quantify activities, processes and phenomena with impact on environmental systems (air, water, and land)
2. Understand the meaning of the environmental quality indicators and select them according to the type of project and environmental system
3. Apply the material balance concept to environmental problems
4. Apply physical, chemical and biological principles to control environmental processes
5. Perform a preliminary quantitative assessment of environmental impacts on water, air, and land
6. Identify technological solutions to specific environmental pollution problems
7. Understand the Chile's environmental legislation as a part of the

Environmental Impact Assessment system

Relation of Course to ABET Criteria:

a. Knowledge of mathematics, science and engineering
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
k. Techniques, skills, and modern tools for engineering practice.

Topics covered:

1. Causes of environmental problems
1.1 Nature and extent of environmental problems
1.2 Natural environmental hazards
1.3 Environmental disturbances as a result of human activity
2. Regulation and environmental legislation
2.1 Basis of environmental policy in Chile
2.2 Setting of environmental quality standards
2.3 Environmental quality standards
2.4 Standard of emission
3. Water pollution
3.1 Wastewater
3.2 Pollution of receiving waters
3.3 Wastewater treatment principles
3.4 Wastewater treatment plants
4. Air pollution
4.1 Basic properties of the atmosphere
4.2 Effects of air pollution
4.3 Sources and control of air pollution
4.4 Predicting concentrations of atmospheric pollutants
5. Soil degradation and contamination
5.1 Engineering properties of soils
5.2 Causes and effects of soil pollution
5.3 Remediation of contaminated soils
5.4 Erosion and slope destabilization
6. Environmental impact assessment
6.1 Principles of environmental impact assessment
6.2 Environmental systems
6.3 Environmental quality indicators
6.4 Identification, assessment and control of impacts