

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

ICH2384 PRINCIPLES OF ENVIRONMENTAL BIOTECHNOLOGY

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:	Gonzalo Pizarro
Course coordinator's name	Gonzalo Pizarro
Textbook:	Rittmann, B. & McCarty, P. Environmental Biotechnology: principles and applications. McGraw Hill, 2002.
Course Catalog Description:	Through a combination of lectures, expert talks, projects and laboratory experiments in these course students will become familiar with the application of biological processes for wastewater treatment.
Prerequisite Courses:	ICH2314 Water Quality
Co-requisite Courses:	None
Status in the Curriculum:	Required Crr 2013
Course Learning Outcomes:	<ol style="list-style-type: none">1. Understand basic concepts of environmental microbiology, including: taxonomy, phylogeny, metabolic diversity, aerobic metabolism, anoxic metabolism, anaerobic and photosynthetic metabolism, microbial ecology.2. Recognize the application contexts of environmental biotechnology and key treatment technologies based on microorganisms.3. Understanding microbial kinetic expressions applicable to different contexts of analysis and design.4. Develop and implement stoichiometric equations to represent microbiological processes, mathematical models of microbial growth, substrate utilization and mass balance applicable to aquatic systems.5. Understand the physical, chemical principles and biological used for the design and analysis of systems based on biofilms (biofilms).6. Understanding the impacts and potential use of environmental biotechnology to public health and environment.
Relation of Course to ABET Criteria:	<ol style="list-style-type: none">b. Design and conduct experiments: analyze and interpret datac. Design a system, component, or processe. Identify, formulate, and solve engineering problemsh. Broad education necessary for global, economic, environmental and

societal context

j. Knowledge of contemporary issues

k. Techniques, skills, and modern tools for engineering practice.

Topics covered:

1. Microbiological principles

2. Microbial kinetics

3. Treatment units

4. Activated Sludge

5. Biofilms

6. Nitrification-denitrification

7. Biosolids treatment