

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

**ICH2374 PRINCIPLES OF PHYSICAL-CHEMICAL TREATMENT**

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| <b>Credits and contact hours:</b>           | 10 UC credits/ 10 hours (4,5 h. Lectures and 5,5 h. Independent learning experiences)   |
| <b>Instructor's name:</b>                   | Gonzalo Pizarro   |
| <b>Course coordinator's name</b>            | Gonzalo Pizarro   |
| <b>Textbook:</b>                            | Hendricks. Water treatment unit processes Physical and Chemical. CRC, 2006.<br><br>Reynolds & Richards. Unit operations and processes in environmental engineering. PWS Publishing, 1996.   |
| <b>Course Catalog Description:</b>          | This course introduces the principles and applications of physical-chemical treatment unit operations and systems typically used in drinking water treatment, sewage, and runoff.   |
| <b>Prerequisite Courses:</b>                | ICH 2314 Water Quality  |
| <b>Co-requisite Courses:</b>                | None  |
| <b>Status in the Curriculum:</b>            | Required Crr 2013   |
| <b>Course Learning Outcomes:</b>            | <ol style="list-style-type: none"><li>1. Describe treatment unit operations present in treatment plants, identifying the main design parameters.</li><li>2. Bulk chemical and physical concepts and principles to solve simple problems of potable water and sewage.</li><li>3. Predesigned unit's physico-chemical treatment of water and wastewater subject to typical conditions of flow and quality.</li><li>4. Understand the importance of a proper treatment of the solids resulting from physico-chemical treatments to drinking water and served.</li><li>5. Perform and interpret simple laboratory experiments associated with the design of unit processing operations (eg, jar test)</li></ol> |
| <b>Relation of Course to ABET Criteria:</b> | <ol style="list-style-type: none"><li>b. Design and conduct experiments: analyze and interpret data</li><li>c. Design a system, component, or process</li><li>e. Identify, formulate, and solve engineering problems</li><li>k. Techniques, skills, and modern tools for engineering practice.</li></ol>  |

**Topics covered:**

1. Preliminary unit operations
2. Based acid neutralization
3. Coagulation-flocculation
4. Sedimentation
5. Filtration
6. Adsorption
7. Ion Exchange
8. Mixing and oxygen transfer
9. VOC Removal
10. Disinfection
11. Trains treatment