VIRTUAL TECHNICAL COURSES PRIOR PROCEMIN-GEOMET 2026

Santiago, Chile Time Zone. GMT -4 | Free Access for Participants

Thursday, July 2

10:00–12:00

SPA

Flotation Process Variables in a Complex Mineralogy Context

Leopoldo Gutiérrez, Professor, Department of Metallurgical Engineering, Universidad de Concepción, Chile

Universidad de Concepción

Friday, July 3

10:00–13:30

SPA

Tailings Circularity and Water Resources in Mining: From Separation to Emerging Technologies.

Juan P. Ibáñez, Jesús Casas, Martha Claros y Yahaira Barrueto, Professors, Department of Mining, Metallurgical, and Materials Engineering, Universidad Técnica Federico Santa María, Chile

UNIVERSIDAD TECNICA FEDERICO SANTA MARIA

COURSE 1: Flotation Process Variables in a Complex Mineralogy Context

Instructor: **Leopoldo Gutiérrez**, Professor, Department of Metallurgical Engineering, Universidad de Concepción, Chile.

WHEN	LENGUAGE	LENGTH
Thursday, July 2	Spanish	10:00 – 12:00 (2 hours)

DESCRIPTION

This short course analyzes the fundamental effects of key flotation variables on the processing of complex mineralogy ores, with an emphasis on copper and molybdenum sulfide systems. The course addresses how mineralogical composition, degree of alteration, the presence of clay minerals and other phyllosilicates, particle size distribution, and process water quality modify the metallurgical response of the system, within a context of complex mineralogy and suspension rheology.

The content is developed from a physicochemical perspective, discussing how these variables affect flotation efficiency. Furthermore, the behavior of altered minerals and complex associations between valuable species and gangue is examined, with special attention to the impact of ultrafines, phyllosilicates, and surface coatings on pulp rheology, process efficiency, reagent consumption, and foam stability. The effect of these variables in stages prior to and following flotation is also reviewed, highlighting their influence on global plant performance.

Finally, operational strategies and technological approaches aimed at managing complex mineralogical systems are presented, with the objective of improving recovery, selectivity, water and reagent efficiency, and the sustainability of mineral concentration processes.

GENERAL OBJETIVES

1. To provide participants with fundamental concepts regarding the impact of key flotation process variables within a context of complex mineralogy and suspension rheological behavior.
2. To review optimization options.
3. To analyze the flotation process from a global perspective.

CONTENT AND PROGRAME

10:00 - 10:50	**Definitions** **Complex minerals** **Suspension rheology**	Prof. Leopoldo Gutiérrez
10:50 - 11:00	Questions and Discussion Module 1	
11:00 - 11:50	**Process variables** **Effect on recovery and concentrate grade** **Effect on water consumption** **Effect on throughput**	Prof. Leopoldo Gutiérrez
11:50 - 12:00	Questions and Discussion Module 2	
12:00 - 12:05	**Conclusions and Closure of the Course**	Coordinador(a) del Curso

LECTURERS BIO

Professor Leopoldo Gutiérrez is a Metallurgical Civil Engineer from the Universidad de Concepción, where he currently serves as a Full Professor in the Department of Metallurgical Engineering. He is also the Deputy Director of the Water Research Center for Agriculture and Mining (CRHIAM), a center of excellence recognized for its contribution to interdisciplinary research on efficient water use in productive contexts. Professor Gutiérrez earned his Doctor of Philosophy (PhD) and Master of Applied Science (MASc) degrees from the prestigious University of British Columbia (UBC) in Vancouver, Canada, one of the world's leading institutions in mineral processing and materials science.

His international background has allowed him to integrate a cutting-edge vision into the development of technological solutions for the mining industry, combining scientific rigor with high-impact practical applications. With more than 26 years of experience in research, teaching, and industrial engagement, he has led multiple innovation projects focused on improving the efficiency of processes such as flotation, thickening, mineral pulp rheology, and water resource management in mining.

His contributions have been recognized both nationally and internationally. In 2006, he was awarded the "Ramón Salas Edwards" Prize for the best scientific or technological work related to engineering. More recently, he received the 2024 Minnovex Award for "Applied Innovation in Mining," a distinction that highlights developments with direct application in actual industrial sites and processes. In 2025, Professor Gutiérrez was honored with the Avonni National Innovation Award in the Mining and Metallurgy category for the creation of KRHEO and RHEOTHINK technologies, an innovative ecosystem for online rheology measurement and management.

Beyond his academic work, Professor Gutiérrez has mentored dozens of engineers, master's, and doctoral students, many of whom now hold key positions in the national and international mining sectors. His work remains a benchmark at the intersection of science, technology, and the mining industry.

His areas of expertise include mineral flotation, surface physicochemistry, ultrafine particle studies in flotation, suspension rheology, and water management in mining.

COURSE 2: Tailings Circularity and Water Resources in Mining: From Separation to Emerging Technologies

Instructors: **Juan P. Ibáñez, Jesús Casas, Martha Claros y Yahaira Barrueto**, Professors, Department of Mining, Metallurgical, and Materials Engineering, Universidad Técnica Federico Santa María, Chile

WHEN	LENGUAGE	LENGTH
Friday, July 3	Spanish	10:00 – 13:30 (3,5 hours)

DESCRIPTION

This technical course provides an integrated vision of circularity in mining, addressing tailings and water resource management from solid-liquid separation to emerging recovery and valorization technologies. The course will review operational fundamentals and design criteria for separation technologies, alternatives for water recovery and treatment, and strategies for tailings reuse and reprocessing, focusing on technical opportunities to increase process efficiency and reduce environmental impacts.

GENERAL OBJETIVES

1. To understand the role of solid-liquid separation technologies in the efficient management of tailings and water in mining.
2. To analyze water recovery and treatment alternatives applicable to mining operations and tailings storage facilities (TSFs).
3. To evaluate options for reuse, reprocessing, and metal adsorption from tailings, including trends and emerging technologies for their valorization.

CONTENT AND PROGRAME

10:00 - 10:50	**Module 1: Solid-liquid separation technologies**	Juan Patricio Ibáñez
10:50 - 11:00	Questions and Discussion Module 1	
11:00 - 11:10	Break 1	

11:10 - 12:00	**Module 2: Water Recovery and Treatment**	Jesús Casas
12:00 - 12:10	Questions and Discussion Module 2	
12:10 - 12:20	Break 2	
12:20 - 13:10	**Module 3: Tailings: Reuse, reprocessing and emerging technologies**	Martha Claros y Yahaira Barrueto
13:10 - 13:20	Questions and Discussion Module 3	
13:20 - 13:30	**Conclusions and Closure of the Course**	Instructors

LECTURERS BIO

Yahaira Barrueto Jhonson: Civil Mineral Processing Engineer with a Ph.D. in the same field. Her research lines focus on circular economy applied to mining processes, particularly in tailings valorization and urban mining. In addition to serving as a faculty member in the Department of Mining, Metallurgical, and Materials Engineering at UTFSM, she is a researcher at SMI Chile.

Martha Claros Vargas: PhD in Mineral Process Engineering. She completed a four-year postdoctoral fellowship in Europe and has academic and research experience across various higher education institutions. Currently, she is a full-time professor in the Department of Mining, Metallurgical, and Materials Engineering at UTFSM, where she is involved in teaching, research, and community engagement. Her research focuses on the synthesis and characterization of metals, metal oxides, and composite nanostructured materials using bottom-up approaches, with applications in engineering and mineral processes.

Juan Patricio Ibáñez: Doctor of Engineering from Tohoku University (Japan) with over 20 years of experience in basic and applied research, and technological development in metallurgical processes. His academic and consulting activities are centered on membrane technology, colloidal systems, applied electrochemistry, and the dissolution of complex minerals and concentrates.

Jesús Casas de Prada: PhD in Chemical Engineering Sciences from the Universidad de Chile and a Postdoctorate from the University of Toronto, Canada. He is a faculty member at the Universidad Técnica Federico Santa María in Chile, an industrial process engineering consultant, and a Qualified Person (QP) in mining resources and reserves in the area of extractive metallurgy. He has over 30 years of professional experience in aquatic geochemistry, electrolyte speciation, phenomenological modeling, and process simulation for water conditioning, neutralization, crystallization, leaching, electrowinning, and mineral flotation.