

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

**IMM3313 MINE PLANNING**

<b>Credits and contact hours:</b>	10 UC credits / 10 hours (3 h. Lectures; 1.5h. Assistantship and 5.5h. Independent learning experiences)
<b>Instructor's name:</b>	Julio Beniscelli, Alvaro Videla
<b>Course coordinator's name</b>	Álvaro Videla
<b>Textbook:</b>	Open pit mining planning & design, Hustrulid, W.A. & Kuchta, M., 1995.  Advances in orebody Modelling and Strategic Mine Planning I, Ed: Dimitrakopoulos, 2010.
<b>Course Catalog Description:</b>	Topics covering this course enable students to understand algorithms and procedures used in reserves estimation and mine planning. It allows them to apply these algorithms in an open pit mine design subjected to geotechnical, geological and geometric constraints.
<b>Prerequisite Courses:</b>	IMM2043: Underground mining and ICS3413: Finance
<b>Co-requisite Courses:</b>	None
<b>Status in the Curriculum:</b>	Required
<b>Course Learning Outcomes:</b>	<ol style="list-style-type: none"><li>1. Understand and apply mining design fundamentals.</li><li>2. Understand and apply mining unitary processes design and operation fundamentals.</li><li>3. Understand and apply short and long term mining planning fundamentals.</li><li>4. Open Pit Limit definition and sequencing by nested pits.</li><li>5. Optimal Life-of-Mine Scheduling.</li><li>6. Phase design and equipment fleet requirements.</li><li>7. Costs and production estimation.</li><li>8. Mine design and production planning using computational tools.</li></ol>
<b>Relation of Course to ABET Criteria:</b>	<ol style="list-style-type: none"><li>a. Knowledge of mathematics, science and engineering</li><li>b. Design and conduct experiments: analyze and interpret data</li><li>c. Design a system, component, or process</li><li>j. Knowledge of contemporary issues</li><li>k. Techniques, skills, and modern tools for engineering practice.</li></ol>

**Topics covered:**

Introduction. The process of mine planning and information required. Outcomes of the mine planning process.

Identification of mine development stages. Prefeasibility and feasibility studies.

Open Pit Limits Definition. Block model and cost estimation. 2D and 3D Lerchs-Grossman Algorithm.

Mining Economics Fundamentals. Cash Flow Calculations. Cost Estimation.

Mine and Mill Plant Sizing. Ore reserves, geometallurgical responses and restrictions.

Open Pit Sequencing by nested pits. Definition of a production plan under geomechanical, geometrical and geometallurgical restrictions.

Production Scheduling. Phase definition, extraction sequence and valuation. Optimal sequence extraction by Lane's algorithm application.

Equipment Fleet determination.  
Investment estimation.

Underground Mine Reserves Definition. Gravitational Flow. Footprint definition and extraction limit.

Underground Mine Operations Sequence. Caving and unitary extraction steps. Area development and extraction sequencing.

Mine Plan Valuation and Report of Ore Reserves.

Uncertainty and Risk Analysis. Introduction to Conditional Simulation and Stochastic long term production scheduling.