Curtin University of Technology	Universidad de Chile
Curtin University	Ingeniería de Minas FACULTAD DE CIENCIAS FÍSICAS Y MATEMÁTICAS UNIVERSIDAD DE CHILE
Graduate Program in Mineral Economics	**Programa** en **Economía de Minerales**

Estimación de Costos e Inversión de Capital

UnitOutline

PROFESOR

Dr. José Munizaga-Rosas

Professor

Prof. José Munizaga-Rosas

- Ingeniero Civil Matemático – Universidad de Chile (Chile)
- Magíster en Gestión de Operaciones – Universidad de Chile (Chile)
- Ph.D. in Natural Resources Engineering – Laurentian University (Sudbury, Ontario, Canada)

El Prof. José Munizaga-Rosas es Ingeniero Civil Matemático. En el pasado reciente el Prof. Saavedra-Rosas se desempeñaba como académico jornada completa en el Departamento de Economía de Minerales y Energía, Curtin University, Perth, Western Australia, es profesor del Máster of Science in Mineral Economics, Curtin University, fue profesor adjunto del departamento de Matemáticas y Estadística, Curtin University e investigador asociado de la Universidad de Western Australia, Centre for Exploration Targeting. Previamente trabajó como profesor del Departamento de Minas de la Western Australian School of Mines en Kalgoorlie, Western Australia, Australia. El área de especialización del Prof. Saavedra-Rosas es la Investigación de Operaciones aplicada a minería con particular énfasis en la incorporación de incertidumbre geológica en la planificación minera. Es autor de publicaciones en congresos, revistas internacionales y un libro. Recientemente el Prof. Munizaga-Rosas ha sido nombrado coordinador académico del Diplomado de Economía de Minerales de la Universidad de Chile, Chile y se desempeña como Principal Consultant/Chief Data Scientist en Coalesce Group., Perth, Western Australia, Australia.

Objectives

After successful completion of this unit the students should be able to:

1. Understand and appreciate the importance of the investment decisions and value creation in the resource sector

2. Apply a theoretical framework of the different specific methodologies for project evaluation and use them to evaluate investment decisions in the resource sector

3. Utilise and interpret the different tools for control and management of investments

4. Develop critical, creative and constructive analysis capabilities of the different concepts, methodologies and criteria utilised in investment decision making

5. Understand the importance and use of reporting standards and the role they play in the whole investment process in the resource sector

6. Understand and apply project management tools for estimation of metrics associated to practical implementation of projects

Unit Organisation

Format of the Teaching Sessions

The format of the unit combines traditional lectures, a project and a final exam. The unit is intended for attendants already familiarised with the mining business and the resource sector. The unit pretends to contribute to an expansion of the resource sector views towards an integral comprehension of the investment decision. Everyday sessions will have the following structure (with the exception of the third intensive day that could be slightly shorter):

Time	**Activity**
9:00 AM to 11:00 AM	Lecture
11:00 AM to 11:15 AM	Break
11:15 AM to 13:15 AM	Lecture
13:15 AM to 14:00 PM	Lunch Break
14:00 AM to 16:00 PM	Lecture
16:00 PM to 16:15 PM	Break
16:15 PM to 18:00 PM	Lecture

Unit Contents

Topic One

a) Unit Presentation
b) Economic Environment
c) General Concepts
d) Introduction to Ordinary Least Squares

Topic Two

a) Business Plan
b) Project Evaluation

Topic Three

a) The framework of Evaluation
b) Costs from an Economic Perspective
c) Capital Costs
d) Cost of Capital
e) Operating Costs

Topic Four

a) Introduction to Linear Programming
b) Projects Portfolio Control and Management
c) Project Financing

Topic Five

a) Project Planning and Control
b) Reporting

Evaluation System

Group Project (50%)
The students will organise themselves in groups of three to four people and will work in a project that will require cost estimation and the use of project evaluation techniques. They will need to submit a report at a date to be agreed with the students where they will discuss their findings. The report needs to be submitted electronically to **vmoller@ing.uchile.cl** as a PDF document and whose size cannot exceed 2Mb, if any group ends up with a report whose size is bigger than 2Mb then it is encouraged to upload the report to a file sharing service (it could be Dropbox for example) and provide the link by email, no hard copy will be accepted, and the deadline will be on the midnight of the agreed date.

Exam (50%)
An online exam is scheduled a couple of weeks after the last day of the intensive session. It will involve calculations, so a standard scientific calculator is recommended to answer the exam. It will cover all the material discussed during the week. To pass the unit, it is required that the student obtains a minimum of 50% in the exam (or 4.0).

Bibliography

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- Runge, Ian. Mining Economics and Strategy. SME, 1998
- Rudenno, Victor. The Mining Valuation Handbook, Mining and Energy Valuation for Investors and Management. 4th Edition. John Wiley & Sons Australia, 2012
- O'Hara, T. Alan and Suboleski, Stanley C. Costs and Cost Estimation. SME

Mining Engineering Handbook, Volume 1, Chapter 6.3, 1992

- CAPCOSTS A Handbook for Estimating Mining and Mineral Processing Equipment Costs and Capital Expenditures and Aiding Mineral Project Evaluations. Andrew Mular, Richard Poulin, CIM Special Volume 47, 1998
- Cost estimation handbook for the Australian mining industry, AusIMM, 412pp. Noakes, M. and others (eds), 1993