

**Department:** Mining Engineering

**Division:** Mining Exploitation

**Level and Major:** MSc, Mining Exploitation

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**Course Title:** Advanced Surface Mining

**Number of Credits:** 3

**Lecturer:** Dr. Morteza Gholi Osanloo

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### **Course Goals and Objectives**

Selection, design and planning of surface mining methods.

### **Course Topics**

- Surface mining methods classification and application
- Guideline and procedure for selecting surface mining methods, conditions, techniques, and mechanisms
- Open-pit mining methods, strip mining methods (contour, area and modified area mining methods) for single and multiple layers
- Quarry mining methods, Auger mining methods, and non-mechanical mining methods (aqueous mining method) including placer and solution mining methods
- Guideline and procedure for selecting surface mines equipment
- Site selection for surface equipment and facility
- Surface mines planning: 1-variable associated, 2-Type of plans
- Cost estimation in surface mining 1-Detailed methods 2-OHara methods
- Evaluation of surface mine projects
- Pit slope and its role in mine design
- Mining royalties- definition
- Mining royalties- calculation
- Fixed cutoff grade and Dynamic cutoff grade Fixed cutoff grade-definition and types: [1] break-even cutoff grade (mine cutoff grade, [2] mill cutoff grade, [3] long term cutoff grade (ultimate pit cutoff grade), [4] short term cutoff grade, [5] mine sustainability cutoff grade

### **Reading Resources**

- Hall, B; Cut-off Grade and Optimizing the Strategic Mine Plan; Spectrum Series 2.0; AusIMM; 2015; 299 pages

- Osanloo, M; Surface mining methods Vol. 1,2; Amirkabir University of Technology; Tehran; 3rd edition -1389-; 1070P
- Kennedy; Surface mining; SME publication Co.; USA; -1990-; 1194P
- Hustrulid W; and Kuchta M., Open-pit mine planning and design; 3rd Ed., Taylor and Francis Group, 2013,1004 pages
- Peter, Darling; SME mining engineering handbook Vol. 1,2; SME 3rd edition -2011- 1984 pages
- Alwyn E. Annels; Mineral deposit evaluation; Chapman Hall; London -1991- P-246~351
- Bhattacherya, Jayanta, Principle of mine planning, Allied publisher limited, New Delhi (2003)450p
- Tatiya RJ, surface and underground excavation methods, techniques and equipment, Belkema, New York (2004) 577p
- Michel Rendu, An introduction to cut off grade estimation, SME,(2014), second edition, 157p
- Osanloo, M, cutoff grade and its role in mine design, Amirkabir University of Technology (1389), 380p
- Botin, J.A. sustainable management of mining operation, Published by SME, USA, (2009), 380 p
- Dimitrakopoulus, R. Advances in orebody modeling and strategic mine planning, AusIMM, (2011), 340 pages
- Wellmer, F.W., Dalheimer, M., and Wagner, M., Economic evaluation in exploration, 2nd edition, Springer, (2008), 263 pages
- Lane, K.F., The economic definition of ore: cutoff grade in theory and practice, 2nd edition, Mining Journal Books, (1999), 212 pages
- James, O.H.O. et.al, Mining royalties, The world bank, Washington USA, (2006), 296 pages
- Michelle E. Jarvie-Egg art, Responsible Mining, SME co, USA, (2015), 788 pages
- Morteza Osanloo, Mehdi Rahmanpour, 2017, sustainable open-pit mine design (ultimate pit limit and cut-off grade determination), LAMBERT Academic Publishing, Germany, 95 pages
- Behzad Ghodrati, Uday Kumar, Hakan Schunnesson, 2017, proceeding of Mine Planning and Equipment selection conference (MPES 2017), Lulea, Sweden, August 2017
- Proceedings of the 27th International Symposium on Mine Planning and Equipment Selection - MPES 2018