

MINING SYSTEMS MECHANIZED

Code	Credit Hour
MinE-846	3-0

CourseDescription

Definition, requirement, types and planning requirements for mechanization, mechanization types, rock cutting, human factor, communication control, latest development, board and pillar mining, optimization in mechanized mining, mechanization in hard rock mining, ventilation needs.

Textbook:

1. Bieniawski, Z.T., 1989, Engineering rock mass classification. New York: Wiley
2. Pickering R.G.B., Du Plessis, A.G. and Annandale, G., 2010, Hard-rock room and pillar mining best practice industry workshop, The 4th International Platinum Conference, Platinum in transition 'Boom or Bust', The Southern African Institute of Mining and Metallurgy
3. Ferreira, P.H., 2005, 'Mechanized mine development utilizing rock cutting and boring through raise and blind boring techniques', The 3rd Southern African Conference on Base Metals, The South African Institute of Mining and Metallurgy, Available from: <http://www.pbzn.org/Kitwe2005/297-312_Ferreira.pdf>

ReferenceBook:

1. Hattingh, T.S., Sheer, T.J., and Du Plessis, A.G., 2010, 'Human factors in mine mechanization', The 4th International Platinum Conference, Platinum in Transition 'Boom or Bust', The Southern African Institute of Mining and Metallurgy, Available from: <http://www.saimm.co.za/Conferences/Pt2010/255-258_Hattingh.pdf>
2. Lonmin, 2008, 'Mechanized mining operations', Available from: <https://www.lonmin.com/downloads/Mechanised_Presentation.pdf>
3. Manroc Development Inc., 2014, 'Conventional & mechanized production mining', Available from: <<http://www.manroc.com/article/conventional--mechanized-117.asp>>
4. Minlog, n.d., 'Underground mechanized mining', Available from: <<http://www.minlog.com/index.php/mining-solutions/underground-mechanised-mining>>
5. Pakistan Mineral Working Group (PMWG), 2013, 'Bringing mining in Pakistan up to international standards', PDAC, Available from: <<http://www.cpcoc.org/Final%20Book%20Setting%20Printo%20Graphic%2072%20pages.pdf>>
6. Valicek, P., Fourie, F., Krafft, G. and Sevenoaks, J., 2012, 'Optimization of mechanized mining layout within Anglo American platinum', The 5th International Platinum Conference 'A Catalyst for Change', The Southern African Institute of Mining and Metallurgy, Available from: <http://www.saimm.co.za/Conferences/Pt2012/1-34_Valek.pdf>
7. Willis, R.P.H., Dixon, J.R., Cox, J.A., and Pooley, A.D., 2004, 'A framework for the introduction of mechanized mining', International Platinum Conference 'Platinum Adding Value', The South African Institute of Mining and Metallurgy, Available from: <http://www.saimm.co.za/Conferences/Pt2004/117_Willis.pdf>

Prerequisites

Nil

ASSESSMENT SYSTEM FOR THEORY

Quizzes	15%
Assignment	5%
Mid Terms	30%
ESE	50%

TeachingPlan

Week No	Topics	LearningOutcomes
1	Introduction	CourseOutline,objectives,teachingplan,assessmentmethod , conceptsreview. Mechanization – definition of terms and objectives
2-3	Types and planning requirements for mechanization	Types of mechanization – its advantages & disadvantages The requirements of a mechanization culture, Planning requirements for a mechanized operation, Engineering infrastructure in underground mechanized mines, Mining value chain and systems analysis techniques
4-5	Mining methods	Mechanization in open pit and under-ground mines
6	Rock cutting	Rock cutting and its application to hard rock, Rock mass ratings and applicable support, The Rock Factory: An operations management approach to mining
7	Human factor	Human factors in mechanization and technology change or “The people issues”
8	Latest developments	Advances in underground communications and control, Latest developments in non-explosive mining
9	MIDTERM EXAM	
10-11	Mechanization calculation	Number and size of units to achieve the required production in a given situation
12	Adaptability	Management of technology trials and the implementation of new technology in mines
13	Optimization	Board and pillar geotechnical environment, Optimization of mechanized mining layout
14-15	Feasibility	Owning and operating costs-the overall "systems engineering"-impact of introducing mechanization. Considerations for the practical application and implementation of mechanized mining in hard rock mines

16-17	Additional energy needs	Mine cooling, specific needs and issues driven by mechanization/ mine ventilation
18	END SEMESTER EXAM	