Mine Dewatering Design and Implementation

Presented by the Department of Mining Engineering, University of Pretoria

Do you have a dewatering challenge?

The Mine Dewatering Design and Implementation course covers the basics and advanced detailed planning for the accurate control and management to prevent uncontrolled water ingress to open pit and underground mines. The mine types studied range from simple open pit to complex block caves and include examples from base metals, precious metals, diamonds, industrials and coal. The dewatering aspects of transition from open pit to underground mine is also covered.

You will be educated in the basic theory of mine dewatering and the application of the knowledge to real world situations. The steps required to design and implement a successful and cost effective dewatering strategy will be taught, including project assessment, planning, site investigations, data interpretation and management, types of dewatering, monitoring techniques and permit preparation.

The course is very comprehensive and includes all types of mines and minerals worldwide. Emphasis is placed on understanding the sources, pathways followed by water into a mine then devising the best approach to control the water and enhance mine production. Focus is on a thorough understanding of how water impacts a mine and all the techniques available to control the water including pumping, diversion, grouting and storm water control.
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Course content

The course will be run over one academic year, with one contact day per month.

Day 1: Introduction to mining hydrology
- Definitions
- Ground water hydraulics
- Governing equations
- Practical on Darcy’s Law and ground water flow
- Ground water recharge

Day 2: Aquifer types and discussion
- Aquifer definitions; confined, unconfined, leaky and semi confined.
- Aquitards and aquicludes
- Primary permeability and fractured permeability
- Aquifer distribution
- Practical on aquifer exploration, investigation and plotting of flow nets

Day 3: Developing a strategy for understanding ground water
- Brown and green field investigations
- Data review techniques
- Site investigation techniques, quantity and quality
- Practical planning an investigation and optimising use of historical data

Day 4: Site investigation specifics
- Drilling and test pumping examples
- Packer testing – use and abuse
- Drilling and testing analysis
- Chemical analyses and isotope use
- Practical investigation interpretation

Day 5: Data management, monitoring and dashboards
- Data management techniques
- Monitoring
- Data to Information to knowledge
- Integration with geotechnical data and mine design
- Practical data plotting and interpretation

Day 6: Conceptual model construction
- Conceptual model approach
- Types of conceptual model
- Inputs and outputs
- Pitfalls and how to avoid them
- Practical construction of conceptual model

Day 7: Numerical modelling
- Integration of modelling data
- Types of models
- Levels of accuracy and use in implementation
- Inputs and outputs
- Risk assessment
- Calibration
- Practical modelling data clean up

Day 8: Numerical modelling continued
- Examples of modelling and case studies
- Modelling applications
- Sensitivity analysis
- Integration of monitoring feedback
- When it is not applicable to use numerical model
- Practical simulation techniques

Day 9: Dewatering techniques and applications
- Open pit mining
- Underground mining
- Transition
- Advantages and disadvantages
- Costing, Opex and Capex
- Legal requirements and permitting

Day 10: Recap on all information shared and techniques
- Review of students own mines and projects
- Implementation strategies
- Assessment of success and failures
- Course assessment
- Exam and practical assignment

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<td>Module 1: Introduction to mining hydrology</td>
<td>07:30–16:30</td>
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<td>8 March 2019</td>
<td>Module 2: Aquifer types and discussion</td>
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<td>Module 3: Developing a strategy for understanding ground water</td>
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<td>11 October 2019</td>
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Learning outcomes
After successfully completing this course, you should have a very good grounding in mine dewatering techniques and the strategy to achieve an accurately dewatered mine.

Who should enrol?
This course is ideal for you if you are a mining engineer, technical manager or hydrogeologist active on mines with water problems.

Course fees
R29 592.00 per delegate (VAT incl.)
Course fees include all course material, refreshments and other materials during contact days.

Course fees must be paid in full 14 days prior to course start dates. Proof of payment can be submitted to enrolments@enterprises.up.ac.za.

Admission requirements
Prospective delegates should have a basic understanding of geology, mine design and production planning. Experience in mining will be an added advantage.

Accreditation and certification
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Registration and enquiries
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Course presenter
Dr Kym L Morton (PhD)
PhD and MBA (Imperial College); MSc (University College, London); BSc Hons (Kings College); FSAIMM FGS Chartered Geologist UK and Pr Sci Nat.

With 35 years’ experience worldwide, Dr Morton presents the course which will cover different mining methods and detail a structured approach to mine dewatering design and implementation.