

SCHEDULE A ∴ Course contents

Day 1

- Introduction (1h)
 - course outline
 - particle size distributions
 - overview of mineral comminution concepts & process
 - overview of mechanical and electrical components
 - overview of mathematical models used in grinding
 - geological factors that influence grinding

- Mills, mechanical components (1h)
 - SAG mill mechanical components
 - ball mill mechanical components
 - screening and hydrocyclones
 - pumps

- Motors & drives (1h)
 - definitions and electrical systems
 - gearless drives & gear drives
 - variable speed
 - electrical efficiency in electrical networks
 - three-phase power concepts
 - how to read a motor name-plate

- Mill liners, lifters and pulp discharge (2h)
 - intent and concepts
 - face angles and ball trajectory
 - lifter wear and ball trajectory
 - prediction of wear rates
 - trading off liner life versus process performance

- Power models for grinding (3h)
 - intent and objectives
 - modelling of grinding by “power models”
 - using power models for prediction of throughput
 - calibrating models for an operating plant (grinding power and specific energy)

Day 2

- Population balance modelling for grinding (1h)
 - intent and objectives
 - types of population balance models (JK SimMet, MolyCop Tools)
 - using MolyCop Tools (just basics, a full MolyCop Tools course is recommended)
- Operating practises (2h)
 - philosophy & types of control systems (e.g. MPC, APC, expert system)
 - how to run a grinding circuit for maximum throughput
 - how to draw power from a SAG mill
 - how to draw power from a ball mill
 - what not to grind
- Functional performance modelling for grinding (1h)
 - intent and objectives
 - circuit sampling required
 - function performance calculation
- Throughput forecasting (1.5h)
 - how to select grindability samples (variability and composites)
 - power-based versus population balance
- Performing a grinding circuit “health checkup” (1h)
 - when to perform a survey (what’s changed?)
 - benchmarking SAG performance (grind-out procedure)
 - benchmarking ball mill performance
 - benchmarking hydrocyclone performance
 - benchmarking pump performance
 - operating costs and how to minimize them
- tutorial (1.5h)