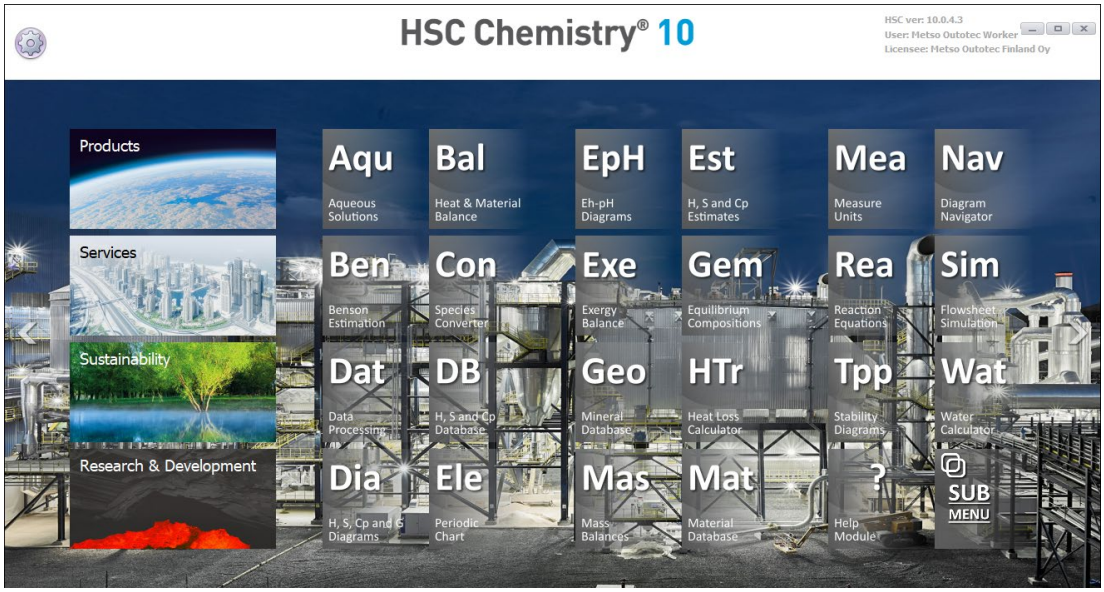
# HSC Chemistry workshop

**12th Feb – 15th Feb 2023**




**HSC is quite easy to use. The HSC installation package contains separate manuals and calculation examples for all calculation modules and databases. In addition, free tutorials are available at Metso's YouTube channel. However, it is not easy to get a good overall picture of this extensive material package with all its application possibilities and the most typical calculation procedures.**
**The HSC Chemistry training courses will help you to get more out of your HSC software.**

## 1. Outline

This will be an on-site training course for the customers in Oman. The program will allow spending more time on the issues that are important for the customer.

Onsite training day consists of 3.5 working days (with necessary breaks in between) with the lecturer.

## 2. Pre-requisites for the participants

- For online courses MS Teams should work on the participant's laptops.
- The official language of the courses is English.
- All participants must bring their own laptops with Windows 10 or 11.
- A fast laptop with at least 16 GB memory and at least 4 GB free hard disk space is needed.
- An external mouse is recommended for flowsheet drawing.
- The latest HSC version will be installed on the laptops and temporary user licenses are available for the participants.
- **NOTE: Participants must have full administrative rights for their computers to allow HSC installation**.
- Participants can test calculation examples on their PC, ask questions at any time, or just follow the presentations.
- Educational background in metallurgy, mineral processing, thermodynamics or chemistry helps a lot to get the most out of the course.

## 3. Pricing and quotations

The price includes training with the lecturer(s), training exercises and workbooks in electronic form, and 30-days HSC course license for the participants.
The latest course price is tentatively priced at **2100 Euro for 3.5 days.**

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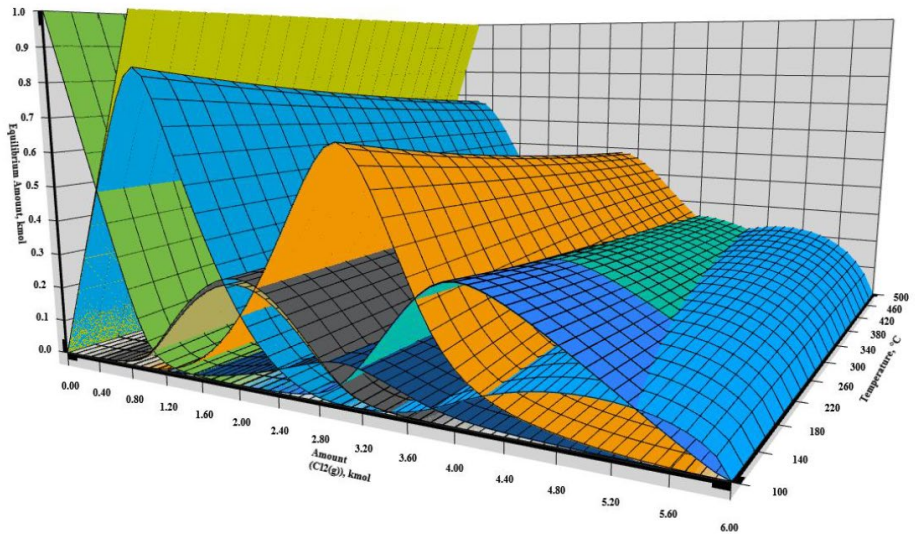
## 4. Different course modules

### 4.1. HSC Basic and Equilibrium – 0.5 day




**HSC Basic course focuses on general information, which is needed to specify a practical problem in the 23 calculation modules, run the calculations, and analyze the results. Not all the modules shall be applicable to this specific training course.**

**Participants will learn what can be done with the HSC package and some ideas on what cannot be done. These skills are also needed in the more advanced HSC Sim Hydro, Sim Pyro, and Sim Mineral Processing courses.**

Most HSC users utilize perhaps only 1-2 of the HSC calculation modules. This course will help users to understand the capabilities of all 23 calculation modules and 12 databases. This course also provides an understanding of the potential applications of HSC.

The target of the Basic HSC Course is to teach the participants what can be done with the HSC package and what cannot be done. The course will focus on the most common questions and problems raised by HSC users over the last few years.

This course gives an overview of the basic HSC operation principles and the major procedures needed to solve more complicated problems with the HSC software. The course will also illustrate thermochemistry application possibilities in practical problems.

HSC Basic contents:

- General information required in most of the HSC modules
- Basic concept, HSC internal structure, user interface issues, etc.
- Some basic principles of thermochemistry related to HSC
- Internal structure of the HSC databases, chemical formula syntax, etc.
- Specification of phases and species, etc.
- Demonstration of the HSC calculation modules with workshop examples

HSC Equilibrium contents:

- Equilibrium calculations with HSC Gem module
- Exercise examples
- Excel Add-in functions
- Thermodynamics

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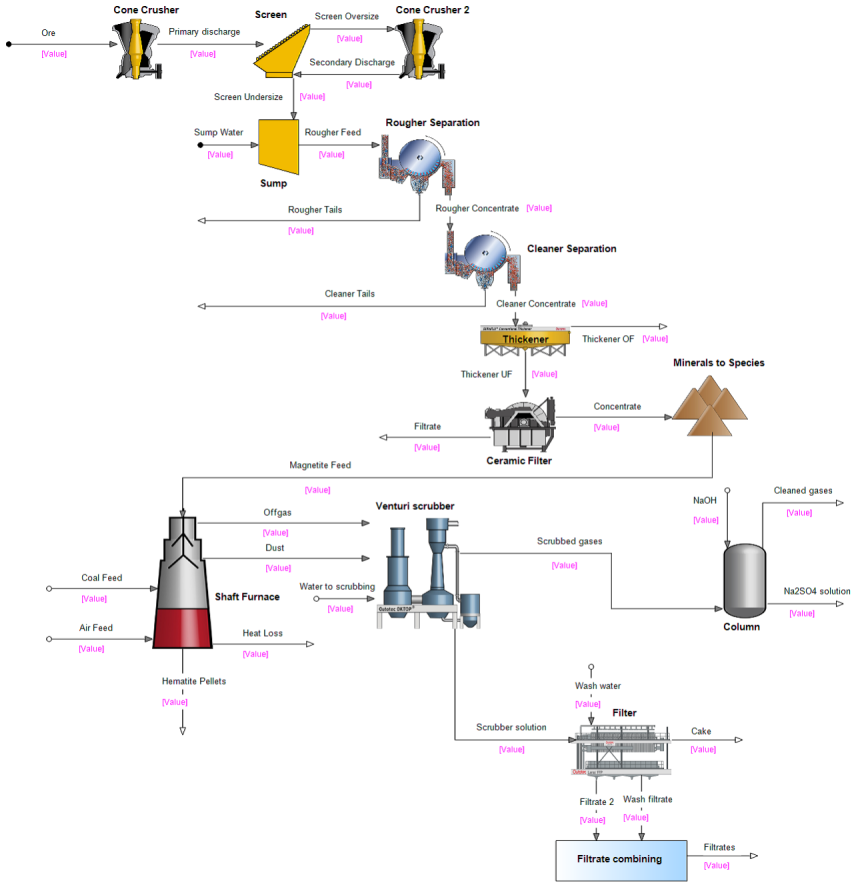
## 4.2. HSC Sim Basic – 0.5 Day




**This course gives an overview of the basic HSC operation principles and the major procedures needed to solve more complicated problems with the HSC software. The course will also illustrate thermochemistry application possibilities in practical problems.**

The Basic Course is intended for beginners and intermediate users of HSC. Earlier use of HSC Sim is not required. However, even more advanced users may find it useful because they will have the opportunity to raise questions concerning more difficult issues. The recommended duration of the course is 1 day.

Contents:

- Introduction to modelling with HSC Sim
  - Static flowsheet calculations
  - Dynamic flowsheet calculations
  - Elemental distribution unit operation model
  - Reaction unit operation model
  - Multiple specific unit operation models for handling particles
  - Different types of controls to set the model convergence
  - Calculating difference scenarios
  - Utilizing HSC Neural Networks with the flowsheet calculations
- Combining models together in the same flowsheet

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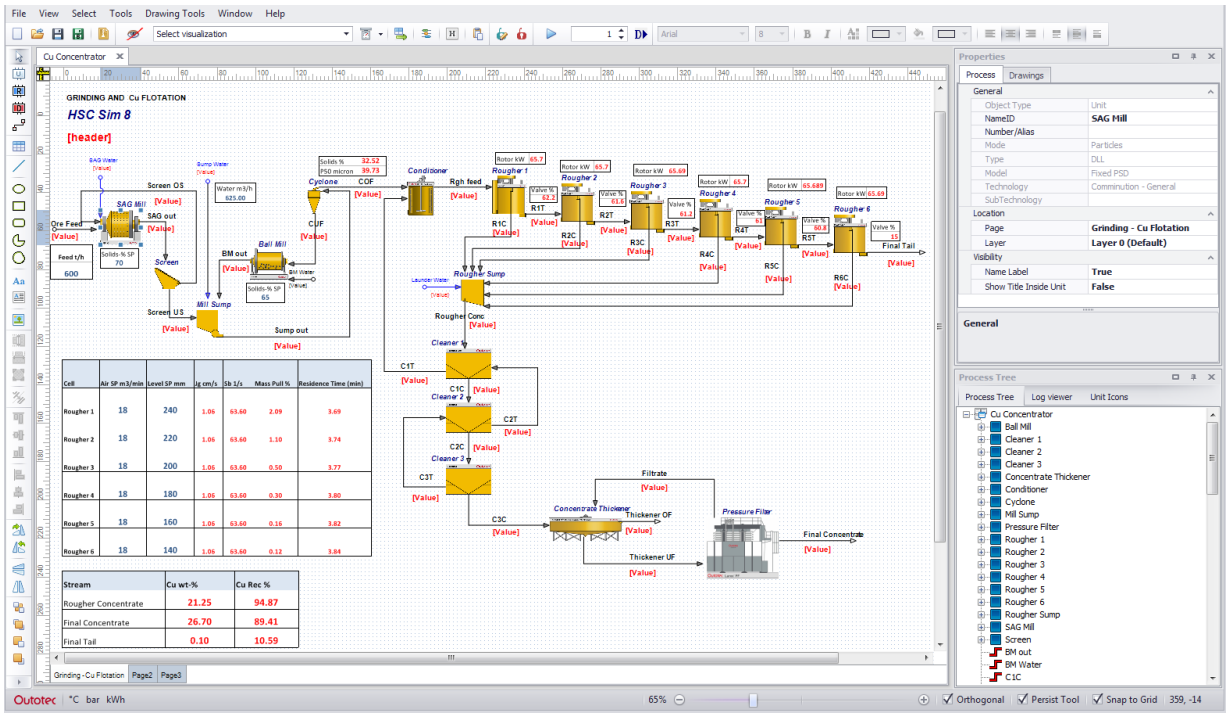
## 4.3 HSC Sim Mineral Processing – 2.5 days




**The course focuses on HSC Sim Particles mode applications. Typically, these are used in mineral processing simulations, but they may also be applied in many other areas, e.g. recycling.**

This course gives an overview of the basic HSC Sim operating principles and the major procedures required to solve more complicated problems. The course will also illustrate the potential applications of HSC Sim mineral processing by means of practical problems. The target of this course is to acquire the versatile skills to use and create Sim Particles mode applications for mineral processing and analyse the results.

The course is suitable for metallurgists, researchers and process engineers who understand the basics of mineral processing. Earlier use of HSC Sim is not required. The recommended duration of the course is 2 days.

Contents:

- Working with ready-made simulation
  - Basic usage of HSC Sim 10 and understanding what can be done with HSC Sim
  - Cell references, running scenarios.
- Creating a simulation model – flotation flowsheet balance
  - Drawing of a flowsheet with HSC Sim
  - Defining the feed stream: stream setup
  - Setting controls
  - Using unit models & simulating
- Kinetic flotation circuit model
  - Introduction to kinetic flotation modelling
- Comminution circuit with size classes
  - Feed composition with size fractions
  - Element to mineral conversion
- Grinding – flotation – dewatering
  - Element to mineral conversion
  - Water balance
- Flotation circuit design and scale-up
  - Plant design: scale-up of laboratory tests and selecting flotation cells