

# 2018 TRAINING COURSES CATALOGUE

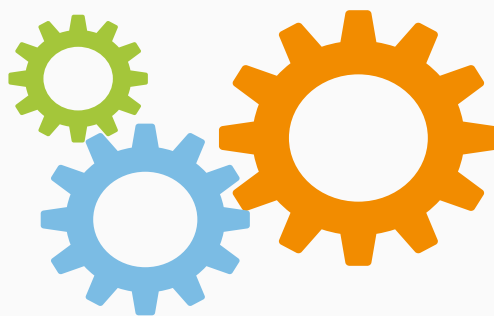
## PROCESS ENGINEERING

SAMPLING  
MATERIAL AND FLOWS CHARACTERISATION  
METALLURGICAL ACCOUNTING  
MATERIAL BALANCE  
MODELLING AND SIMULATION  
PIPING NETWORK DESIGN

MINERAL

AGRO-INDUSTRIES

WASTE





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## 2018 training courses calendar

### Sampling with ECHANT software

- February 6-7
- September 18-19

### Sampling & measurement error calculation for insurance and quality control

- February 8
- September 25

### Material balance with BILCO software

- March 13-14
- October 23-24

### Metallurgical accounting

- March 6-7
- November 13-14

### Process modelling and simulation with USIM PAC software

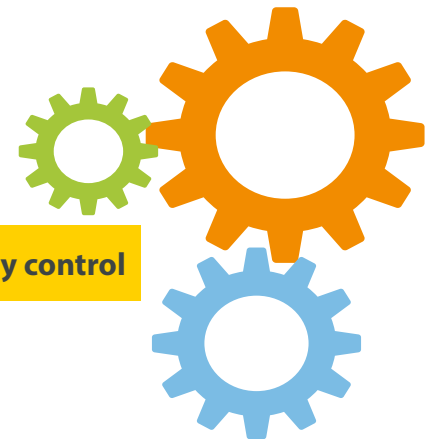
- March 20-22
- November 20-22

### Process modelling and simulation with USIM PAC Agro software

- March 26-27
- November 26-27

### Piping network design with FluidFlow software

- May 28-29
- December 3-4



CUSTOMIZED TRAINING  
[info@caspeo.net](mailto:info@caspeo.net)  
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## TRAINING

# Sampling with ECHANT software

### OBJECTIVE

Introduction to ECHANT software for fundamental sampling error estimation

### INTENDED AUDIENCE

Process engineers, technicians concerned by sampling and measurement for process audit, site diagnostic and material characterisation

## OUTLINE

### Introduction

#### What is "sampling"

- Generalities
- Sampling quality
- Sampling error approach
- Material heterogeneity

#### Pierre Gy's theory

- Fundamental Sampling Error (FSE)
- Application fields

#### Case studies

- Calculation of fundamental sampling errors for various types of materials
- Different cases of sampling plans

#### Training evaluation

### TEACHING METHODS

- Training is based on documents given to the trainees.
- Using the ECHANT software, trainees will apply the theory to solve industrial case studies.

### PREREQUISITES

- Use of spreadsheet software (such as Microsoft Excel)

### DURATION

1.5 day

### REGISTRATION FEE

990 € (excl. taxes)

### DATES

- February 6-7, 2018
- September 18-19, 2018

### VENUE

Orléans, France

### ADVANTAGES

- Theoretical and practical approach
- Training in French, English or Spanish



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## TRAINING

# Sampling and measurement error calculation for insurance and quality control

### OBJECTIVE

Estimate overall errors for moisture and particle size distribution analyses

### INTENDED AUDIENCE

Process engineers, technicians concerned by material characterization (quality control, plant survey and site diagnostic)

### OUTLINE

#### Measurements and their sources of uncertainty

- Measuring moisture content and particle size distribution
- Overview of the standards
- Origins of measurement uncertainty and variability

#### Estimate the measurement error

- Components of the total measurement error – application to moisture content and particle size distribution
- Weighing error calculation
- Sampling error for moisture
- Sampling error for particle size distribution
- Analytical error of size distribution proportions for a simple case
- Uncertainty range for a size distribution
- Measurement error for parameters such as mean size, d80 or d95, dispersion

#### Case studies

- Calculation of the total measurement error of the moisture content and particle size distribution for various materials and measurement methods
- Design of a sampling and measurement plan for moisture content and particle size distribution to meet tolerance requirements
- Design of a sampling plan for the size distribution measurement of a coarse material
- Case of stocks or material stream

### TEACHING METHODS

- Training is based on documents given to the trainees.
- Several real cases, using spreadsheet, illustrate the theoretical presentations.

### PREREQUISITES

- Use of spreadsheet software (such as Microsoft Excel)
- Knowledge of methods for measuring moisture content and particle size distribution
- Basic knowledge of sampling issues

### DURATION

1 day

### REGISTRATION FEE

750 € (excl. taxes)

### DATES

- February 8, 2018
- September 25, 2018

### VENUE

Orléans, France

### ADVANTAGES

- Approach based on real cases
- Training in French, English or Spanish



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## TRAINING

# Material balance with BILCO software

### OBJECTIVE

initiation to BILCO software: data reconciliation by material balance

### INTENDED AUDIENCE

Process engineers, technicians, students concerned by material balance problems

### OUTLINE

#### Introduction

- Data reconciliation
- Material balance through an example
- Necessary data (material description, experimental measurements, material conservation constraints)
- Notion of measurement error
- BILCO calculation algorithm
- Results analysis

#### Case study: Global plant analysis

- Initialisation and data input functions
- Implementation of the calculation algorithm
- Results display and interpretation

#### Case studies

- Material balance computation on complex industrial cases
- Chemistry-mineralogy reconciliation
- Environmental impact assessment
- Recycling
- Customized cases

### TEACHING METHODS

- Training is based on documents given to the trainees
- Using the dedicated BILCO software, trainees will apply the theory to solve material balance problems

### PREREQUISITES

- Computing: Use of spreadsheet software (such as Microsoft Excel)
- Process: Basic notions on main equipment, physical and chemical process

### DURATION

2 days

### REGISTRATION FEE

1250 € (excl. taxes)

### DATES

- March 13-14, 2018
- October 23-24, 2018

### VENUE

Orléans, France

### ADVANTAGES

- Approach based on real cases
- Training in French, English or Spanish



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## TRAINING

# Metallurgical accounting

Principles, main applications and practical implementation

### OBJECTIVE

Introduction to the main features of a metal accounting system through practical examples

### INTENDED AUDIENCE

Process and production engineers, Financial managers, Laboratory managers, Quality controllers

### OUTLINE

Introduction: Why metallurgical accounting?

The AMIRA code and its consequences

Definitions and theory

- Data reconciliation by material balance
- Granularity
- Periodicity and scenarios
- Data workflow and validation

Practical implementation

- Life cycle of a metallurgical accounting system
- Measurement and data management
- Data storage and inventory
- Improvement of granularity
- Implementation case with the INVENTEO solution

Main applications

- Critical case of smelters
- Mine to mill
- Aluminium refinery

### TEACHING METHODS

- Training is based on documents given to the trainees.

### PREREQUISITES

- Use of spreadsheet software (such as Microsoft Excel)
- Be involved/interested in material balance and metal accounting

### DURATION

1,5 day

### REGISTRATION FEE

990 € (excl. taxes)

### DATES

- March 6-7, 2018
- November 13-14, 2018

### VENUE

Orléans, France

### ADVANTAGES

- Theoretical and practical approach
- Training in French, English or Spanish



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## TRAINING

# Process modelling and simulation with USIM PAC software

For mineral industry applications

### OBJECTIVE

Discovering the USIM PAC software functionalities for design and optimization

### INTENDED AUDIENCE

Process engineers, technicians, students concerned by process design and optimization

### OUTLINE

#### Introduction

#### General presentation of USIM PAC software

- Functions/How to use it? / Data structure
- «Guided tour»
- Data input and result display functions

#### Modelling and simulation of grinding / classification circuits

- Case study #1: Preliminary design of a grinding circuit

#### Mass balance reconciliation

- Principle/Data used/Algorithm
- Examples

#### Modelling and simulation of a concentration circuit

- Case study #2: Optimization of a grinding and flotation circuit

#### Other case studies (selection based on attendees profile)

### TEACHING METHODS

- Training is based on documents given to the trainees
- Using specialized software products, trainees will apply the theory to solve industrial case studies

### PREREQUISITES

- Computing: Use of spreadsheet software (such as Microsoft Excel)
- Process: Basic notions on main equipment, physical and chemical process of mineral

### DURATION

3 days

### REGISTRATION FEE

1780 € (excl. taxes)

### DATES

- March 20-22, 2018
- November 20-22, 2018

### VENUE

Orléans, France

### ADVANTAGES

- Practical approach of simulation
- Training in French, English or Spanish



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## TRAINING

# Process modelling and simulation with USIM PAC Agro software

For agro-industries applications

### OBJECTIVE

Discovering the USIM PAC Agro software functionalities for design and optimization of agro-industries process

### INTENDED AUDIENCE

Process engineers, technicians, students concerned by process design and optimization of biorefineries and food processes

## OUTLINE

### General presentation of USIM PAC Agro software

- Main functions
- «Guided tour»
- Modelling of material from living sources
- Presentation of the main unit operation models for agro-industries

### Generation of a consistent and detailed mass balance from measured data

- Principles of data reconciliation by material balance / required data / algorithm
- Application example: material balance of a pilot operation for plants extraction

### Sizing an industrial plant from pilot operation data

- Main equipment sizing
- Establishment of predictive material balances
- Investment and operation cost calculation

### Existing plant optimization

- Equipment settings
- Improvement of material yields
- Optimisation of thermal exchanges

## TEACHING METHODS

- Training is based on documents given to the trainees
- Using specialized software products, trainees will apply the theory to solve industrial case studies

## PREREQUISITES

- Computing: Use of spreadsheet software (such as Microsoft Excel)
- Process: basic notions on main equipment, physical and chemical process of primary material from living sources (plants, algae, milk, sea...)

## DURATION

2 days

## REGISTRATION FEE

1250 € (excl. taxes)

## DATES

- March 26-27, 2018
- November 26-27, 2018

## VENUE

Orléans, France

## ADVANTAGES

- Practical approach of simulation
- Training in French, English or Spanish



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## TRAINING

# Piping network design with FluidFlow software

### OBJECTIVE

Discover the FluidFlow functionalities for piping network design and pressure loss calculation

### INTENDED AUDIENCE

Process engineers, technicians concerned by piping design and fluid networks optimization

## OUTLINE

### Introduction

### Software Overview

- Basic equations and theoretical concepts
- Flowsheet building, data input, results display and analysis
- Main functionalities of the software for incompressible fluids calculations

### Advanced use

- Database management (fluids, equipment, pipes, valves, materials...)
- Heat transfer calculation
- Combination or Mixing of Fluids
- Compressible Flow
- 2-Phase Liquid/Gas

### Non-Newtonian & Settling Slurry calculation

- Non-Newtonian/non-settling liquids: theoretical concepts implemented in the software
- Case studies with non-Newtonian fluids
- Case studies with settling slurries

### Teaching methods

- Training is based on documents (slides and teaching aid) given to the trainees
- The trainees will apply the theory to solve a wide range of practical case studies with the software

## TEACHING METHODS

- Training is based on documents (slides and teaching aid) given to the trainees
- The trainees will apply the theory to solve a wide range of practical case studies with the software

## PREREQUISITES

- Basic knowledge of fluid mechanics

## DURATION

2 days

## REGISTRATION FEE

1250 € (excl. taxes)

## DATES

- May 28-29 2018
- December 3-4 2018

## VENUE

Orléans, France

## ADVANTAGES

- Practical approach of fluidflow networks
- Training in French or English



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## Our animators, all experts in process engineering

### STEPHANE BROCHOT, PhD

Graduate from the University of Orleans-Tours (France), he obtained his doctorate (PhD) in 1990 and completed his education with a master in mathematical engineering and computer processing techniques. He joined BRGM in 1991 as researcher in process analysis for the design and optimisation of solid processing plants (ores, contaminated soils, wastes). In 2004, he created Caspeo, a spin-off of BRGM, and since, has been one of the co-managing director as the scientific and technical manager. He has animated lots of training sessions in many countries and is giving courses in several Universities.

### MARIE-AMELIE DE VILLE D'AVRAY, PhD

Graduate from the French "Agroparistech" engineering school in Food Processing and Science, she joined Caspeo in 2005. In 2010, she obtained her Ph.D. in Process Engineering, specializing in the mathematical modelling and simulation of industrial processes. Since 2012, she animates FluidFlow and USIM PAC Agro training sessions.

### MARIE-VERONIQUE DURANCE

Graduate from the French National Engineering School of Geology (1990) and from the Business Administration Institute (2000), she worked for BRGM from 1991 to 2003 as an international project manager in the field of process audit and development for the mineral and environmental industry. In 2004, she created Caspeo, a spin-off of BRGM, and since, has been one of the co-managing director. Besides the general management of the company Marie-Véronique DURANCE keeps commercial and technical roles. She has animated lots of training sessions in many countries.

### MANUEL GONZALEZ

Graduate from the Oviedo Mining School (Spain, 2011) Manuel Gonzalez completed his education with a Master of Science in Quality Management, Environmental Management and Innovation at the Official College of Mining Engineers of North West Spain (2012). In 2012, he joins Caspeo, France as process engineer. He is relocated in Chile where he contributes to the foundation of Caspeo Chile (2014). Besides being the Managing Director, he is also involved in plant design and optimisation projects using modelling and simulation. He also participates to the implementation of metallurgical accounting systems. He has animated several courses about process simulation, material balance and metallurgical accounting.

### PHILIPPE WAVRER, PhD

Graduate from the University of Nancy (France), he defends a PhD thesis in 1996 about the adaptation of Pierre Gy's theory of sampling to waste and contaminated soils. Philippe joined Caspeo in September 2014 and is in charge of market development in the field of waste. Engineer then Project manager during 20 years at BRGM, the French Geological Survey, he is specialized in the characterization and treatment of domestic and industrial waste. Meanwhile, he has also animated training sessions or university courses about sampling. He brings to Caspeo his competency in sampling, a deep knowledge of the French and European actors and contribute to the definition and guidance of the Caspeo R&D in the waste field.



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## REGISTRATION FORM

**To send back by e-mail or postal mail**

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CASPEO - 3 Avenue Claude Guillemin - BP 36009 - 45060 ORLEANS CEDEX 2 - FRANCE

### INFORMATION ABOUT THE TRAINING SESSION

Training session

Date

Price

How did you hear about it?

### COMPANY INFORMATION

Name

Address

Zip code

City

Country

VAT No  
(for European country)

### PARTICIPANT INFORMATION

Name

Surname

Position

Phone

E-mail

Name

Surname

Position

Phone

E-mail

Date

Signature

**For any cancellation, less than 10 days before the start of the training session, 50% of the price will be invoiced.**

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