LIFELONG LEARNING COURSES

Strengthening the Raw Materials Sector

This activity has received funding from the European Institute of Innovation and Technology (EIT), a body of the European Union, under the Horizon 2020, the EU Framework Programme for Research and Innovation.
EIT RawMaterials

EIT RawMaterials, initiated and funded by the EIT (European Institute of Innovation and Technology), a body of the European Union, is the world’s largest innovation community in the raw materials sector. Its vision is to develop raw materials into a major strength for Europe. Its mission is to enable sustainable competitiveness of the European minerals, metals and materials sector along the value chain by driving innovation, education and entrepreneurship.

EIT RawMaterials unites more than 120 core and associate partners and over 180 project partners from leading industry, universities and research institutions from more than 20 EU countries. Partners of EIT RawMaterials are active across the entire raw materials value chain; from exploration, mining and mineral processing to substitution, recycling and circular economy. They collaborate on finding new, innovative solutions to secure the supplies and improve the raw materials sector in Europe.

Lifelong Learning

Working in close cooperation with our industrial partners, the EIT RawMaterials Academy delivers a variety of Lifelong Learning courses to professionals and technologists in industry, but also researchers in academia and those who are keen to make the transition to the raw materials sector.

The diversity and breadth of the Lifelong Learning courses in the EIT RawMaterials Academy enable learners to acquire new knowledge and skills in their area of work, widen their area of expertise and grow their network of contacts in an evolving raw materials sector.

As an alumnus, you will have the opportunity to expand your knowledge and skill-set with future RawMaterials Academy offerings, build your academic and professional networks and get more actively involved through EIT RawMaterials Alumni activities.

Courses

EIT RawMaterials’ suite of Lifelong Learning courses are arranged according to their main focus across six key themes along the value chain. A further set of Cross Value Chain courses address multiple themes. Key topics within the scope of the courses include Industry 4.0 and digitalisation, materials for sustainability, resource efficiency, environmental impact measurement and mitigation, entrepreneurship, policy and leadership, and health and safety. Many of our courses can be run in-house or in a bespoke manner for corporate partners and clients. You are invited to review our range of courses and to contact the organisers directly or email academy@eitrawmaterials.eu if you require further information.

EXPLORATION
- Exploration, (E)Valuation and Reporting of Raw Material Deposits
- Introduction to the Valuation of Mineral Assets
- Raw Materials and Energy in the 21st Century and Beyond - A Big Data and Data Science Drive
- Valuation of Mineral Assets

MINING
- Cash Flow Modelling of Metal Mining Projects
- Continued Education Programme in Rock Engineering for Deep Mines
- Corporate Social Responsibility – A Life-Cycle Assessment from Prospect to Closure
- Dust, Noise and Vibration Management in the Mining Industry - Workplace and Environment
- Geology and Rock Cutting Technologies with their Influences on Mechanical Cutting Applications
- Innovative Subsurface Mining Imaging Systems

PROCESSING
- An Introduction to Automated Materials Characterisation
- Comminution of Minerals
- Design and Up-scaling in Mineral Processing
- Electrochemical treatment of industrial waters: techno-economical assessment
- Introduction to Metallurgy & Properties of Ferrous Materials
- Modelling and simulation as a tool in process optimisation and development of metallurgical operations
- Practical course: materials testing for metals
- Raw Materials and Water Treatment Based on Membrane Technology
- The Full Supply Chain of Powder Metallurgy

RECYCLING
- Circular Economy and Recycling
- Recycling Chemistry: from theory to practice
- Circular Residue Usage in the Metallurgical Industry

SUBSTITUTION
- Introduction to LCA and its application to Materials Design and Recycling
- Materials for Lightweight Design - How to Treat them Right
- The World of Perlite - Overview
- The World of Perlite - Innovative Applications

CIRCULAR ECONOMY
- Circular Economy Innovation
- Competitive Sustainable Business from Metal Recycling
- Engineering Design for a Circular Economy
- Simulation-Based Footprint of Technology

CROSS VALUE CHAIN
- Bring your tech to the market
- Eco-innovations: Challenges and Innovation Development for SMEs
- Introduction to P5 Impact Analyses – Integrating Sustainability into Project Decisions
- Introduction to Reporting in the Mineral Industry
- P5 Impact Analyses – Holistic Decision Making to Improve the Triple Bottom Line
- Project Optimisation & Risk Minimisation for Responsible Resource Developments
- RawMatCop Academy 2019: Copernicus for Raw Materials, Discover the potential!
- Reporting in the Mineral Industry - Resources & Reserves, Asset Valuation, Sustainability and Social Responsibility
- Risk Assessment in Projects
- Soft Skill Leadership and Prevention of Crisis
- Spring School on Circular Economy
- The Excellent Tech Transfer Office
EXPLORATION
AND RAW MATERIALS RESOURCE ASSESSMENT
Innovative and efficient technologies, securing raw materials supply in Europe
**EXPLORATION**

**Introduction to the Valuation of Mineral Assets**
**ECLC ProSchool**

**Overview**
This is an introductory course on the valuation of mineral assets, focusing on:
1. The international valuation standards and guidelines.
2. The methods used in the valuation of the several types of mineral properties.

**Target**
Early stage graduate and post-graduate geology and mining students aiming to pursue a career in mining finance.

**Objective**
Participants in the course will learn to:
- Use international valuation reporting standards
- Select the appropriate method for the valuation of mineral assets

**Content**
The course is presented in two segments in one day.

**Language**
English is the default language. The course may also be taught in Portuguese (please enquire).

**Course Instructors**
Luís Chambel, Mining Engineer, MBA, MSc Engineering Geology, PhD Engineering Sciences

**Fees**
€800 (EIT RawMaterials partner: €600). Price includes a catering package. Fees are subject to change. Please check our website for the latest information.

**Date & location**
4 June 2019, Freiberg | 2 October 2019, Freiberg. Additional locations may be available upon request.

**Registration and additional information**
Willem Zank
E: willem.zank@eit.tu-freiberg.de
W: courses.eitrawmaterials.eu

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**Lead partner:**

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**Raw Materials and Energy in the 21st Century and Beyond - A Big Data and Data Science Drive**
**ECLC ProSchool**

**Overview**
This course presents and discusses big data and data science techniques and their applications in exploration, mining and the sustainable use of raw materials and energy resources in the 21st century and beyond.

**Target**
The course’s intended audience includes:
- Managers of mining and exploration companies.
- Investment advisors and investment banking executives (e.g. fund managers), investors and potential investors in the extractive industry.
- Graduate and post-graduate geology and mining students.

**Objective**
Participants in the course will be able to inform and design long-term strategies:
- On raw materials and energy resources acquisition for the 21st century and beyond.
- To implement data science and other big data-based technologies in raw material companies.

**Course Instructors**
Luís Chambel, Mining Engineer, MBA, MSc Engineering Geology, PhD Engineering Sciences
Teresa Burguete, Mining Engineer, MBA, MSc Mining Engineering, PhD student

**Fees**
€1800 (EIT RawMaterials partner: €1500). Price includes a catering package. Fees are subject to change. Please check our website for the latest information.

**Date & location**
Additional locations may be available upon request.

**Registration and additional information**
Willem Zank
E: willem.zank@eit.tu-freiberg.de
W: courses.eitrawmaterials.eu

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**Lead partner:**
## Valuation of Mineral Assets

### ECLC ProSchool

**Overview**
This course concerns the valuation of mineral assets, focusing on:
1. International valuation standards and guidelines
2. Methods used in the valuation of the several types of mineral properties.

**Target**
The intended audience of the course includes:
- Managers of mining and exploration companies.
- Investment advisors and investment banking executives (e.g. fund managers), investors and potential investors in the extractive industry.
- Graduate and postgraduate geology and mining students aiming to pursue a career in mining finance.

**Objective**
Participants in the course will learn to:
- Use international valuation reporting standards.
- Analyse and evaluate the level of risk in a mineral project.
- Select and use the appropriate method for the valuation of mineral assets.

**Type of training**
- Classroom
- Computer
- Group work
- Self study

**Content**
The course is presented in six modules over three days.

#### Day 1
**Morning:** An overview of exploration and mining activity, markets and international reporting standards and guidelines.
**Afternoon:** Types of mineral assets. Interpretation of companies’ financial reports. Case analysis and discussion.

#### Day 2
**Morning:** Types of valuation methods. An introduction to the discounted cash flow model.
**Afternoon:** Risk in mineral projects. Discount rate assessment. Case analysis and discussion.

#### Day 3
**Morning:** Other valuation methods for developed or active mining assets. Valuation methods for exploration assets.
**Afternoon:** Case analysis and discussion. Conclusions.

**Language**
English is the default language. The course may also be taught in Portuguese (please enquire).

**Course Instructors**
- Luís Chambel, Mining Engineer, MBA, MSc Engineering Geology, PhD Engineering Sciences
- Teresa Burguete, Mining Engineer, MBA, MSc Mining Engineering, PhD student

**Fees**
- Fees are subject to change. Please check our website for the latest information.

**Date & location**
11-13 June 2019, Freiberg. Additional locations may be available upon request.
For the latest dates, please visit our online catalogue at rawmaterialsacademy.eu/lifelonglearning.

**Registration and additional information**
Willem Zank
E: willem.zank@eit.tu-freiberg.de
W: courses.eitrawmaterials.eu

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Cash Flow Modelling of Metal Mining Projects

**Sustainable Follow-Up RM ProSchool**

**Overview**
This course will give you tools to improve your operational cash flow models and budgeting tools. The effects of market and project uncertainties are discussed and methods to include their effects into feasibility analysis / budgeting are provided. Furthermore, methods to deal with uncertainty realisations are discussed and modelled.

**Target**
Executives / leading / senior experts of metal mining companies interested in improving the economic profitability of operations; parties investing or interested in investing in mining operations - e.g. Operational CEOs / CFOs; Business Controllers; Business Analysts; Industry / Banking / Investment Industry Consultants

**Objective**
The trainees will be able to:
- Use the concepts of numeric uncertainty presentations in spreadsheet (Excel) cash flow modeling.
- Take advantage of option theory and how it is converted into flexibility value in the metals mining industry.
- Create and analyse System Dynamic Models of metal mining investments.

**Type of training**
Classroom, Computer, Self study.

**Content**
This two-day intensive course covers the following topics:

1. **Introduction**
   - Real option analysis in the industrial context
   - Specific issues of modelling
   - Uncertainty representations
   - Modelling of metal prices
   - Importance of financing in the profitability of mining investments
   - Real Option valuation methods for metals mining
   - Pay-off method
   - System dynamic models and Monte Carlo simulation
   - Practice valuing real options with Excel
   - System dynamics (Xcos or equivalent)
   - Summary and wrap-up

**Before the intensive course:**
- Participants write down key issues they are facing with the current cash flow models used or think of a case example of an investment analysis problem they have encountered.
- Participants will provide material to the lecturer two weeks prior to the course, and parts of this material will be used to formulate practical exercises for the course.

**After the intensive course:**
- Participants will continue to solve their provided case studies using methods learned in the course.
- A Skype consultation (min. ~1h) will be offered individually for each participant for a case example follow-up / wrap-up.

**Language**
English.
Overview

Target

Objective

Type of training

Content

Language
Corporate Social Responsibility – A Life-Cycle Assessment from Prospect to Closure

ECLC ProSchool

Overview

The intended audience for the course includes:
- Managers of mining and exploration companies
- Investment advisors and investment banking executives (e.g., fund managers), investors, and potential investors in the extractive industry
- Graduate and postgraduate geology and mining students aiming to pursue a career in mining finance

Objective

Participants in the course will learn to:
- Plan corporate social management programmes based on the mineral deposit lifecycle, the external environment they are located in, the perceived risks and social forces, designing the information to collect as a reliable basis to develop a minimum-conflict mining project
- Use international corporate social responsibility standards
- Analyse and evaluate the social and environmental risk of a mineral project
- Select and use the appropriate methodology for the analysis of interactions of mineral projects with the natural, social, and human environments

Type of training

Course Instructors

Luís Chambel, Mining Engineer, MBA, MSc Engineering Geology, PhD Engineering Sciences
Teresa Burguete, Mining Engineer, MBA, MSc Mining Engineering, PhD student

Language

English is the default language. The course may also be taught in Portuguese (please enquire).

Content

Day 1
Morning: Challenges and trends in society: mineral use, activism, economy, climate change, critical raw materials, responsible sourcing.
Exploration and mining activity and their impact in people, society and nature – lessons from history.

Afternoon: Exploration and mining activity: managing social and environmental risks.
Presentation of the Kimberley Process case – group assignment.

Day 2
Morning: Corporate social responsibility and stakeholders engagement.

Afternoon: The Neves-Corvo case – group assignment.

Day 3
Morning: Reporting to society: international standards.

Afternoon: Responsible sourcing, responsible use and reuse. The Angolan diamonds case – group assignment.

Fees

€1800
€1500, EIT RawMaterials partners
Price includes a catering package.
Fees are subject to change. Please check our website for the latest information.
Dust, Noise and Vibration Management in the Mining Industry - Workplace and Environment
ECLC ProSchool

Overview
The improvement of dust and noise management is a permanent challenge in mining and mineral processing for both staff and the environment.
This course is structured in 3 parts:
- Noise and vibrations management (half day)
- Air quality management (half day)
- Field trip Fa-Mining site Erzberg (half day)

Target
- Site Managers
- Environmental Protection Officers
- Quality Managers
- Health and Safety Officers

Objective
Participants will gain an overview on how to assess the environmental and health situation of their own mining or processing plant, and the possibilities for improvement.

Type of training
Classroom. The course combines classroom lectures and field inspection.

Content
- Noise and vibrations:
  - General information on noise in the mining industry.
  - Industrial machines and their impact on people and environment (measurements, analysis, and minimising of effects).
  - Noise protection measures.
  - Introduction: vibrations caused by blasting open pit mines and their impact on people and environment (measurements, analysis, and minimising of effects).
  - Vibration protection measures.
- Air quality and dust management:
  - How to quantify emission rates, in particular regarding diffuse emissions.
  - Special focus on hazardous components such as asbestos, quartz and heavy metals.
  - Calculation and measurement of environmental impact.
  - Possibilities for improvement.

Language
English (prerequisite).

Course Instructors
Experienced instructors from Eurofins NUA Umwelt GmbH & Co KG.

Fees
€600 for EIT RawMaterials partners, €780 for external partners. Course fees include catering, learning materials and excursion. Fees are subject to change. Check our website for the latest information.

Date & location
See our online calendar at rawmaterialsacademy.eu/lifelonglearning
Montanuniversität Leoben & Erzberg, Austria. Additional locations may be available upon request.

Registration and additional information
See our online calendar at rawmaterialsacademy.eu/lifelonglearning
Montanuniversität Leoben & Erzberg, Austria. Additional locations may be available upon request.

Lead partner:
Willem Zank
E: willem.zank@eit.tu-freiberg.de
W: courses.eitrawmaterials.eu
Geology and Rock Cutting Technologies with their Influences on Mechanical Cutting Applications
ECLC ProSchool

Overview
This training programme will give participants an understanding of the application of mechanical excavation machines in mining and tunnelling — from the assessment of rock mass cuttability, over the basic principles and methods of mechanical cutting to machine types and technologies.

Target
The course is aimed at professionals in the mining and tunnelling industries.

Objective
The training programme was developed to provide a common understanding of mechanical cutting applications and excavation machines.

The Tribology section offers an in-depth understanding of tribology, friction and wear with a special focus on mining activities and equipment. This includes test methods and approaches to evaluate wear phenomena in the interaction of rock mass and mining equipment. Together with the basics of tribology, material, surface and lubrication technologies this will allow the participants to comprehensively assess the best conditions to avoid future wear phenomena and to define the appropriate countermeasures.

Type of training
Classroom, Group work.

Content
Day 1:
09:00-09:30 Registration, welcome, safety introduction and short company presentation of Sandvik Mining and Construction GmbH, Zeltweg, Austria
09:30-12:00 Presentation of cutting technologies, mechanical cutting application and testing, and the basics of tribology
12:00-13:00 Lunch break
14:00-15:00 Basics and details about rock cutting technology and methods
15:00-17:00 Factory tour with visits of rock testing laboratory and cutting test rigs

Day 2:
09:00-10:00 Tribological aspects of interaction between Rock and Cutting Tool and Equipment
10:00-11:00 Basics of Tribology and Wear Phenomena
11:00-12:00 Factory tour with visits of rock testing laboratory and cutting test rigs
12:00-13:00 Lunch break
13:00-14:00 Application of tribological aspects of rock cutting equipment
14:00-15:00 Discussion and Q&A

Language
English.

Course Instructors
Dipl.-Ing. Hubert Kargl, Sandvik Mining and Construction GmbH, Zeltweg, Austria
Prof. Dr.-Ing. Jörg Benndorf, TU Bergakademie Freiberg
Dr.-Ing. Alexander Tscharf, Montanuniversität Leoben
M.Sc. Thomas Peinsitt, Sandvik Mining and Construction GmbH, Zeltweg, Austria

Fees
EURO 1,200

Date & location
16-17 October 2019, Zeltweg, Austria. Additional locations may be available upon request.
For the latest dates, please visit our online catalogue at rawmaterialsacademy.eu/lifelonglearning

Registration and additional information
Anja Meier, BA
E: anja.meier@unileoben.ac.at
W: courses.eitrerawmaterials.eu

Lead partner:

Innovative Subsurface Mining Imaging Systems
ECLC ProSchool

Overview
Underground surveying and monitoring is essential for the success of high-performance underground mining operations.

Target
Engineers, technicians and scientific users in the field of underground mining with special regards to underground surveying, mapping and inspection. Representatives of authorities, mining companies, universities and service providers.

Objective
Participants will develop their knowledge of:
- Innovative underground imaging systems (laserscanning, hyperspectral and RGB imaging etc).
- Basic technology selection, application, work principles, limits of use, advantages and disadvantages.
- Evaluation and further use of results.

Type of training
Classroom, Group work

Content
Module 0: Applications and requirements for subsurface mining imaging
Module 1: Underground navigation and positioning
Module 2: Basic systems for underground mapping/underground mapping and inspection, applications and existing solutions
Demonstration - Underground mapping and inspection
Module 3: Workshop - Feature extraction (geological classification)
Module 4: Applications in underground mining/data management and data handling

Language
English.

Course Instructors
Prof. Dr.-Ing. Jörg Benndorf, TU Bergakademie Freiberg
Dipl.-Ing. Alexander Tscharf, Montanuniversität Leoben
M.Sc. Thomas Peinsitt, Sandvik Mining and Construction GmbH, Zeltweg, Austria

Fees
EURO 1,200 for EIT RawMaterials partners, EURO 1,580 for external partners. Course fees include catering and learning materials.
Fees are subject to change. Check our website for the latest information.

Date & location
24-25 September 2019, Montanuniversität Leoben, Austria. Additional locations may be available upon request.

Registration and additional information
Anja Meier, BA
E: anja.meier@unileoben.ac.at
W: courses.eitrerawmaterials.eu

Lead partner:
PROCESSING
INCREASED RESOURCE EFFICIENCY IN MINERAL AND METALLURGICAL PROCESSES
Improved resource efficiency and safety

An Introduction to Automated Materials Characterisation
ECLC ProSchool

Overview
A comprehensive introduction to “Automated Materials Characterisation” / “Automated Mineralogy”, an analytical technique based on scanning electron microscopy (SEM) image analysis coupled with energy dispersive X-ray spectroscopy (EDS).

Target
Professionals in mineral exploration, mining, processing, beneficiation, aggregates industries, metal industry, special glass industry, environmental business, or oil and gas industries.

Objective
Participants will gain an understanding of:
- The history and fields of application of “Automated Materials Characterisation”, as well as the structure and outcomes of MLA and QEMSCAN software.
- They will also learn about the evaluation and value of results parameters.

Type of training
The course combines classroom lectures, MLA lab session and practical sessions.

Content
Module 1: Introduction to “Automated Materials Characterisation” / “Automated Mineralogy”.
Module 3: MLA lab session.
Module 4: Data processing and analysis results. Module 5: Practical sessions.

Language
English (prerequisite)

Course Instructors
Dipl.-Geoln. Sabine Gilbricht, TU Bergakademie Freiberg.
Dr. Dirk Sandmann, Helmholtz Institute Freiberg for Resource Technology.

Fees
€1,200 for EIT RawMaterials partners.
€1,500 for external partners.
Course fees include catering, learning materials and lab visit.
Fees are subject to change. Check our website for the latest information.

Date & location
See our online calendar at rawmaterialsschool.eu/lifelonglearning.
Location: EIT RawMaterials - Regional Center Freiberg, Germany.
Additional locations may be available upon request.

Registration and additional information
E: event@eit.fu-berlin.de
W: courses.eitrawmaterials.eu/EIT/

Lead partner:
### Comminution of Minerals
#### ECLC ProSchool

**Overview**
Efficient comminution processes require careful process design and a deep understanding of the fundamentals of grinding as well as the appropriate machinery.

**Target**
Engineers, technicians and scientific users in the fields of mineral processing, process, mechanical, environmental and chemical engineering or metallurgy. Others employed in production, sales, maintenance, laboratory, R&D and related fields.

**Objective**
Participants will gain:
- Knowledge of material characterisation in crushing and grinding circuits
- Understanding and influencing of fracture behaviour in comminution processes
- Basic knowledge of machinery selection: application, design, working principles, and basic engineering of the different types of crushers and mills in mineral processing
- Process related know-how: design, evaluation, and optimization of crushing and grinding circuits

**Type of training**
The course combines classroom lectures and lab visits.

**Content**
- Module 1: Characterisation of disperse systems
- Module 2: Breakage fundamentals
- Module 3: Equipment
- Module 4: Crushing and grinding circuits

**Language**
English (prerequisite).

**Course Instructors**
- Dr.-Ing. Thomas Leißner, TU Bergakademie Freiberg
- Dr.-Ing. Thomas Mütze, TU Bergakademie Freiberg
- Prof. Dr.-Ing. Urs Peuker, TU Bergakademie Freiberg

**Fees**
- €735 for EIT RawMaterials partners
- €980 for external partners

Course fees include catering, learning materials and lab visit. Fees are subject to change. Check our website for the latest information.

**Date & location**
Location: EIT RawMaterials - Regional Center Freiberg, Germany. Additional locations may be available upon request.

**Registration and additional information**
E: event@eit-tu-freiberg.de
W: courses.eitrawmaterials.eu/EIT/

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### Design and Upscaling in Mineral Processing
#### PROCHAINE

**Overview**
PROCHAINE delivers an advanced level, practical training programme on the topic “Design and upscaling in mineral processing”. PROCHAINE covers the whole process development chain - from ore mineralogy and bench scale testing to continuous plant process assessment and process optimisation in a state-of-the-art pilot plant.

**Target**
Professionals already working in the mining sector, who are keen to learn more about mineral processing.

**Objective**
Participants will gain an advanced level of knowledge on the theory and practical issues related to the design and upscaling of the ore beneficiation process, and how design and upscaling relates to the operations and economics of mineral processing plants.

The training programme consists of individual training modules which can also be partly tailored to the specific needs of each particular student group.

**Type of training**
- Training module 1: Introduction to upscaling and laboratory scale tests in mineral processing.
- Training module 2: Introduction to continuous plant operations and pilot plant training.
- Training module 3: Demonstration Plant

**Language**
English.

**Course Instructors**
- Module 1: Luleå University of Technology
- Module 2: University of Oulu / Oulu Mining School, Outotec and Schneider Electrics
- Module 3: Geological Survey of Finland / GTK Mintec

**Fees**
See www.prochain.eu

**Date & location**
Module 1: Luleå University of Technology
Module 2: Programmed for early Spring period
See our online catalogue at rawmaterialsacademy.eu/lifelonglearning For the latest dates, please visit our online catalogue at rawmaterialsacademy.eu/lifelonglearning Additional locations may be available upon request.

**Registration and additional information**
W: prochain.eu
Electrochemical treatment of industrial waters: techno-economical assessment
Sustainable Follow-Up RM ProSchool

Overview
This course will provide you with knowledge about the current electrochemical treatment of industrial waters as well as give you tools to improve and assess water treatment on sites. The effect of electrochemical treatment on the removal of contaminants, possible application and feasibility studies are discussed during the course. You leave the course with a ready and assessed solution to treat your water streams.

Target
Environmental engineers; water treatment technology providers; researchers in the field of water treatment; process engineers in water treatment facilities.

Objective
Participants will:
- Familiarise themselves with the current application and utilization of electrochemical treatment on an industrial scale.
- Identify, classify and choose contaminants that can be successfully removed by electrochemical methods to meet the limits - Distinguish the parameters affecting the electrochemical treatment.
- Develop and integrate the treatment facility containing electrochemical unit to treat mining waters.
- Evaluate the suitability of the electrochemical treatment of waters at various industrial locations.
- Compare electrochemical treatment with conventional technologies by means of the integration of water balance modelling.

Type of training
1. Introduction to electrochemical processes.
   a. electrocoagulation, electrooxidation, electrodissolution, electro Fenton, electrodegradation, electroflotation
2. Removable contaminants.
   a. metals, organic matter, N-compounds, cyanide, sulfate and other anions
3. Main processes.
   a. operating conditions and parameters affecting the treatment
4. Post treatment technologies.
   a. slurry dewatering opportunities and challenges
5. Industrial applications and pilot studies.
   a. water management and feasibility of mining
   b. methods and examples for feasibility analysis

Before the intensive course:
- Each participant should provide information on the possible case where the electrochemical treatment unit may be installed at the industrial location, as well as specify the contaminants and their concentration ranges in the water to be treated. If the participant is not from industry, he/she should think about the case where he/she wants to apply the technology and why.
- Participants will return material to the lecturer 2 weeks before the course and parts of the material will be used to adjust the theoretical part and formulate practical exercises for the course.

After the intensive course:
- Participants will continue developing their case examples using the provided knowledge.
- A Skype-consultation (min. – 1h) will be offered individually for each participant for a case example follow-up/wrap-up.

Classroom, E-learning, Computer, Group work, Self study.

Language
English.

Course Instructors
MSc. Tech., MSc. Ed. Maria Mamelkina
Jyrki Savolainen

Fees
€1500 for EIT RawMaterials Members
Includes catering

Date & location
2-3 April 2019
3-4 June 2019
3-4 September 2019
Freiberg, Germany

Registration and additional information
E: willem.zank@eit.tu-freiberg.de
W: courses.atrawmaterials.eu

Lead partner:
Willem Zank

Lead partner:
**Overview**

The course is targeted at people working in R&D, as well as researchers from industry, RTOs and universities. The expected learning outcomes include improved understanding and skills related to how modelling and simulation can be used as a tool in process and plant optimisation tasks, how models are built, reliability analysis of models and the benefits of modelling and simulation in terms of, for example, savings in time and costs and improved reliability of laboratory data.

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**Target**

Employees of raw materials producers as well as recycling companies

PhD and Master students in the fields of chemistry, electronics, processing science

To attend this course, you should have training or experience in the field of engineering or natural science.

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**Objective**

Participants will gain an overview of the production chain/processes following the raw material extraction and processing. The aim is to initiate an appreciation for the needs of the producing industry sector.

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**Type of training**

Classroom.

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**Content**

- Extraction and processing of raw materials
- Phase Diagrams
- Microstructure
- Introduction to metallurgy
- Forming and shaping processes
- Mechanical Properties of metals
- Exemplary applications

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**Language**

English, German on request

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**Course Instructors**

Dr. Jens Helbig, Institute for Chemistry, Materials- and Product Development at the TH Nürnberg

Prof. Dr. Berthold von Großmann

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**Fees**

€1390 for external partners

€100 for EIT RawMaterials partners

Price includes teaching material and catering package.

Fees are subject to change. Please check our website for the latest information.

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**Date & location**

Dates tbd. For the latest dates, please visit our online catalogue at rawmaterialsacademy.eu/lifelonglearning

- Nürnberg, Germany. Additional locations may be available upon request.

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**Registration and additional information**

Sabine Betz-Ungerer

E: sabine.betz-ungerer@th-nuernberg.de

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**Modelling and simulation as a tool in process optimisation and development of metallurgical operations**

**Sustainable Follow-Up RM ProSchool**

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**Overview**

Metals recovery through the pyro- and/or hydrometallurgical route is a complex and multidimensional process where multiple unit operations are used. Metallurgical unit operations are most often multiphase systems, and research and development faces many of the challenges typically found with such systems. In view of the complexity of the task, the use of sophisticated modelling and simulation tools is a valid approach for analysis of important phenomena behind the operations, their interactions and relative importance.

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**Target**

The course is targeted at people working in R&D, as well as researchers from industry, R&D and universities.

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**Objective**

The expected learning outcomes include improved understanding and skills related to how modelling and simulation can be used as a tool in process and plant optimisation tasks, how models are built, reliability analysis of models and the benefits of modelling and simulation in terms of, for example, savings in time and costs and improved reliability of laboratory data.

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**Type of training**

Classroom, E-Learning, Computer, Self study.

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**Content**

The course starts with a webinar that serves as an introduction to the topic: an case study of an industrial-scale simulation model showing what the benefits of building a simulation mode are, how such a model can be built, and how its reliability can be studied. After the introduction webinar, participants have the opportunity to study background material and to give feedback before the 2-3 day face-to-face training period is run. The face-to-face training includes lectures and open discussion in group as well as demonstrations of modelling cases. Experiences and feedback from the face-to-face training are collected and afterwards an online session will take place in which open issues and possible further question can be presented.

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**Language**

English

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**Course Instructors**

D.Sc. (Tech.) Fedor Vasilyev, Specialist in modelling and simulation at Outotec Oy

D.Sc.(Tech.) Matti Lampinen, Project Manager in the School of Engineering Science at LUT University

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**Fees**

€1800

€1500 for EIT RawMaterials Members

Price includes teaching material and catering package.

Fees are subject to change. Please check our website for the latest information.

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**Date & location**

Autumn 2019: TBA

For the latest dates, please visit our online catalogue at rawmaterialsacademy.eu/lifelonglearning

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**Registration and additional information**

Matti Lampinen

E: matti.lampinen@lut.fi

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Practical course: materials testing for metals
ECLC ProSchool

Overview
Trainees will have a grasp of materials behaviour and the influence of raw materials quality and processing on the quality of materials.

Target
- Employees of raw materials producers and recycling companies
- PhD and Master students in the field of chemistry, electronics, processing science

Objective
The course will give the attendees a better grasp of the relationships between materials composition, processing and properties.

Type of training
Classroom, Self study, Practical training sessions (lab)

Content
- Introduction to materials testing
- Structure-property-relations in metals
- Heat treatment
- Mechanical properties: tensile test, hardness, abrasion, impact
- Microstructure

Language
English, German on request

Course Instructors
Dr. Jens Helbig, Institute for Chemistry, Materials- and Product Development at the TH Nürnberg
Prof. Dr. Berthold von Großmann

Fees
- €1890 for external partners
- €1590 for EIT RawMaterials partners
Price includes teaching material and catering package.

Date & location
01 - 02 October 2019, 09:00 - 18:00, Nürnberg

Registration and additional information
Sabine Betz-Ungerer
E: sabine.betz-ungerer@th-nuernberg.de

Raw Materials and Water Treatment Based on Membrane Technology
Sustainable Follow-Up RM ProSchool

Overview
This short course uses a technological approach to teach understanding of water management-related issues as they relate to the raw materials sector.

Target
Professionals, managers and entrepreneurs in the raw materials sector who want to contribute to increasing their company’s water related resource efficiency activities, to improve water based treatment processes in related production or to initiate research and development of innovative solutions in this area.

Objective
Participants, together with experts, will be able to identify and design processes that can be used to resolve a production-specific or product-relevant task in their sphere of influence.

Type of training
Classroom

Content
- Module 1: Water treatment and purification
- Module 2: Pressure driven membrane processes
- Module 3: Membranes, membrane elements and modules
- Module 4: Application areas for different membrane processes
- Module 5: Scaling, fouling and biofouling
- Module 6: Operation related aspects
- Module 7: Technological trends

Language
English (prerequisite)

Course Instructors
Dr.-Ing. Thomas Peters, Consulting for Membrane Technology and Environmental Engineering

Fees
- €1,500 for EIT RawMaterials partners,
- €1,800 for external partners.
Course fees include catering, learning materials and lab visit.
Fees are subject to change. Check our website for the latest information.

Date & location
See our online calendar at rawmaterialsacademy.eu/lifelonglearning
Location: EIT RawMaterials - Regional Center Freiberg, Germany.
Additional locations may be available on request.

Registration and additional information
E: event@eit.tu-freiberg.de
W: courses.eitrawmaterials.eu/EIT/
The Full Supply Chain of Powder Metallurgy

PM Life

<table>
<thead>
<tr>
<th>Overview</th>
<th>The Powder Metallurgy (PM) community led by the European Powder Metallurgy Association (EPMA) offers a unique lifelong learning programme devoted to a PM sector, with a three week internship.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target</td>
<td>Newly-recruited or regular employees of PM companies or universities, as well as PhD students and recent graduates. Possibility of limited number of seats for participants from the marketing field. The training is also suitable for any person willing to learn and apply for a position in this expanding sector.</td>
</tr>
<tr>
<td>Objective</td>
<td>Participants will learn about the full supply chain of powder metallurgy. They will understand the physical and chemical phenomena occurring during every PM process and will become aware of the technological and economic issues related with the implementation of the process in a company.</td>
</tr>
<tr>
<td>Type of training</td>
<td>Classroom, Blended Learning, Excursions, Group work</td>
</tr>
</tbody>
</table>
| Content | Training weeks:  
1. Powder production: Chalmers University, Gothenburg, Sweden.  
2. Press and sinter: Grenoble INP, France.  
4. Hot isostatic pressing: The Manufacturing Technology Centre, Coventry, UK.  
5. Additive manufacturing: IFAM Dresden, Germany.  
Each week will consist of basic and advanced courses on specialised PM topics and horizontal topics including materials science and engineering and entrepreneurship, case studies in factories or universities and a plant visit.  
The three-week internship will take place in a company or in a university associated with the project where each trainee will put course learning into practice in an actual working environment. |
| Language | English (prerequisite) |
| Course Instructors | Courses will be taught by local and external lecturers from both academy and industry. Examples of involved companies are Höganas, Sandvik, Sinteritech, Osterwalder, Bodycote, Arburg. Internships will be supervised by researchers or engineers from the hosting organization. |
| Fees | Fees vary based on the details of the activities chosen by the participant (number of training weeks, internship or not) and on the category of the participant (employee from the industry, PhD. student, individual).  
Fees range from €400 (individual registration to one training week) to €7,000 (industrial registration to full package).  
Course fees include course teaching materials, accommodation, lunches and social programme.  
Fees are subject to change. Check our website for the latest information. |
| Date & location | See our online calendar at: rawmaterialsacademy.eu/lifelonglearning |
| Registration and additional information | W: pmlifetraining.com |

Lead partner: Grenoble INP
## Circular Economy and Recycling

### ECLC ProSchool

<table>
<thead>
<tr>
<th>Overview</th>
<th>Get an overview of Circular Economy, goals, action plans, waste hierarchy, recycling rates and more. Learn about the challenges of recycling special mineral waste and landfill mining.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target</td>
<td>Engineers, technicians and scientific users in the field of raw materials and mining, career changers looking to have an excellent start in a new business, engineers with a new field of responsibility within a company, engineers in SMEs wishing to establish new technologies in their company, representatives of authorities, mining companies, etc.</td>
</tr>
<tr>
<td>Objective</td>
<td>Learn more about the European Way to Circular Economy and the challenges of recycling of special mineral waste.</td>
</tr>
<tr>
<td>Type of training</td>
<td>Classroom, Group work</td>
</tr>
<tr>
<td>Language</td>
<td>English</td>
</tr>
</tbody>
</table>
| Content | 09:00 Welcome & Coffee  
09:30 The European Way to Circular Economy  
10:45 The Challenges of Recycling Special Mineral Waste  
12:00 Lunch Break  
13:00 Landfill Mining  
14:15 Waste Mineralogy  
15:30 Workshop Sampling & Analysis of Waste  
17:30 Dinner |
| Fees | €780  
€660, for EIT RawMaterials partners  
Fees are subject to change. Please check our website for the latest information. |
| Date & location | 19 September 2019, 09:00 – 17:30, Montanuniversität Leoben  
For the latest dates, please visit our online catalogue at rawmaterialsacademy.eu/lifelonglearning  
Additional locations may be available upon request. |
| Registration and additional information | Anja Meier, BA  
E: anja.meier@unileoben.ac.at |
Recycling Chemistry: from theory to practice
RefresCO

Overview
Mixing and separating for recycling and reformulation of metals as well as electrolytes contained in extremis "wastes" requires mastering dissolution, the formulation of complex fluids, selective extraction and finally re-mixing in order to obtain recycled products with new economic value.

Target
The course is aimed at technical employees with a Master of Science, more specifically, engineers / researchers working in industry or research and development in the field of metals recycling (mixing and separating for recycling and reformulation of metals as well as electrolytes contained in extremis wastes).

Objective
Participants will be brought up-to-date on the current state of the art of physical chemistry concepts in Liquid-Liquid extraction.

Type of training
- SPOC (Small Private Online Course)
- 14 hours of recorded lectures
- Quiz
- 3 sessions of discussion with the professors (visioconference)

Content

**PREREQUISITE CONCEPTS**
- Solvents and solubilisation
- Hydrophobic and surfactant-free microemulsions
- Deep eutectic solvents
- Chemical potentials: a general view at equilibrium
- The Gibbs triangle and its usage

**SCIENTIFIC BASIS**
- Establishing binary phase diagram
- Pseudo-phases versus microphases
- Reading binary phase diagrams
- Solubilisation in two phases systems
- Establishing ternary phase diagrams
- Osmosis and electrolyte solutions
- Specific ion effects in solution
- Specific ion effects at interfaces
- Dynamics in electrolytes solution: a panorama

**IMPLEMENTATION IN EFFICIENT SEPARATION PROCESSES**
- Basic concepts of liquid formulation
- Liquid–liquid extraction at mesoscale
- Macroscopic modelling: mass transfer and mass balance
- Typical devices used in liquid–liquid extraction
- Addressing apparatus design: scale-up and scale-down
- Cloud point extraction in practice ionic liquids
- Ternary phase diagrams and safety of extraction
- Separation by transport properties (flotation)
- Pulsed column functioning: hydrodynamic issues

Language
English

Course Instructors
Faculty: INSTN
Werner Kunz, University of Regensburg
Thomas Zemb, University of Montpellier – INSTN
Jean-François Dufrêche, University of Montpellier
Sophie Charton, CEA Marcoule

Fees
Free for REFRESCO attendants

Date & location
Opening of the SPOC: 15 October 2018
Distance meetings with professors: schedule to be determined

Registration and additional information
Procedure to register: send an email to spoc@icsm.fr, you will be invited to participate

Lead partner: CEA
Circular Residue Usage in the Metallurgical Industry

CIRRUS

Overview
This course delivers high quality education by formalising existing knowledge on secondary materials and residues with a focus on their possible use as raw materials and with special emphasis on industry challenges, using recent research findings.

Target
Professionals in the metallurgical industry, at institutes and environmental agencies, PhD students, decision makers and engineers new to the area.

Objective
Participants will enhance the development of practical applications for returning residues and the use of secondary materials to improve material and energy efficiency in relevant industries. In a wider context, the impact of material properties on behaviour in the process can be used for consideration of the use of alternative and low-quality raw materials in general.

Type of training
Classroom, E-Learning.

Content
Introduction to the course and participants, basic knowledge on secondary materials, their origin and characteristics as well as challenges and possibilities of recycling.

20 - 24 May 2019, University of Oulu, Oulu, Finland
From the content: Further development on webinar topics, methodology for residual characterization, pre-treatment, agglomeration, recycling into ferrous, base metals, ferro-alloys, non-ferrous industry, special processes for recycling etc. Moreover, support to case studies with topics selected by participants.

25 September 2019, Follow-up Webinar
Presentations and discussion of case studies form course participants.

Language
English (prerequisite).

Course Instructors
Swerea MEFOS AB. Process metallurgy experts from partner universities.

Fees
Free of charge

Date & location
10 April 2019 (09:00-11:00 Central European Time), Webinar

Registration and additional information
For information on additional dates, contact the organisers.

Lena Sundqvist-Ökvist
E: lena.sundqvist@swerim.se

Caisa Samuelson
E: caisa.samuelsson@ltu.se

Eetu-Pekka Heikkinen
E: eetu.heikkinen@oulu.fi

Karel Van Acker
E: karel.vanacker@kuleuven.be

Dan Hallberg
E: dan.hallberg@lkab.com

Lead partner:
Swerim
Introduction to LCA and its application to Materials Design and Recycling
RefresCO

Overview
The LCA (Life Cycle Assessment) approach is increasingly used to analytically evaluate the environmental impact of a product or a process. It has become a fundamental tool for both design and environmental certification.

Target
Managers, engineers, designers.

Objective
Trainees will be able to understand the LCA methodology and its potential in the field of design of components and/or management of industrial processes.

Type of training
Classroom, Group work

Content
- LCA: principles, methodologies, characteristics, standards
- Designing with a LCA approach
- Environmental certification by LCA
- LCA applied to recycling of materials in automotive and transport fields

Language
English or Italian.

Course Instructors
Professors from Padova University, External industrial experts

Fees
See our online catalogue at rawmaterialsacademy.eu/lifelonglearning

Date & location
See our online catalogue at rawmaterialsacademy.eu/lifelonglearning

Registration and additional information
Registration process managed by SIAV (Industrial Association of Veneto Region)
Possibility to run in-house (possibility to deliver the program at the industrial site) with 10-20 participants
For further information visit refrescoetrm.eu

SUBSTITUTION
OF CRITICAL AND TOXIC MATERIALS IN PRODUCTS FOR OPTIMISED PERFORMANCE
Sustainable materials for key technologies
Overview
The courses are aimed at employees in industry whose work involves planning the manufacture of lightweight products, and at employers that want to start manufacturing products based on lightweight concepts. The basic level is designed both for managers, engineers and technical staff. The advanced and expert modules are for technical specialists.

Objective
Participants will be able to identify and differentiate the steps involved in developing lightweight products, and to use (design, construct and set up processes with) specific lightweight materials in the correct way to fully utilise the potential of lightweight strategies.

Type of training
Classroom, Videos, E-learning, Blended learning, Self-study.

Content
Lightweight professional courses aim to deliver high quality content and ready-to-use practical information. All levels offer certification according to DIN EN ISO 17024. The certificates confirm that successful participants have acquired expertise and practical knowledge in the relevant area. The basic level comprises one module and a final examination to be certified. The advanced and expert levels comprise six modules each whereof four modules have to be chosen. All modules can also be booked individually and independently from the certification procedure.

Course content (basic level):
- Environmental impact of lightweight construction socio-political background, governmental (European) strategies, ecobalance, need for recycling and circular economy, marketing issues
- Definition of Lightweight design and strategies, design processes
- Construction guidelines in lightweight product development
- Materials knowledge related to properties and processes
- Health and safety issues
- Manufacturing specifics, cost-value ratio
- Supply chain - definition of criteria to identify reliable suppliers
- Planning and management

Course content (advanced and expert level)*:
Lightweight materials: properties, manufacturing processes, challenges (recycling, costs, supply), multi-material design:
- Light alloys
- Cast iron
- Fibre reinforced material
- Magnesium
- High strength steels
- Plastics
- Powder metals
- Joining techniques
- Testing
- Recycling

*modules subject to change, will be launched in 2020

Target
The courses are aimed at employees in industry whose work involves planning the manufacture of lightweight products, and at employers that want to start manufacturing products based on lightweight concepts. The basic level is designed both for managers, engineers and technical staff. The advanced and expert modules are for technical specialists.

Language
Basic level (introductory module) in German, English, Italian or Spanish. The other modules will be given in English.

Course Instructors
- Munich: Prof. Dr. Andreas Büter
- Belgium: Dominik Laveuve
- Spain: Dr. Jon Aurrekoetxea
- Italy: Dr. Paolo Ferro

Fees
The course fee is €1.200 per module and covers:
- Preliminary e-learning course
- Course documentation
- Lunch and drinks during breaks
- For every certification level, there is an additional one-off Examination fee of €195

Date & location
3-5 September 2019, Munich, Germany (in German language)
17-19 September 2019, Leuven, Belgium (in English language)
8-10 October 2019, Bilbao, Spain (in Spanish language)
10 October 2019, 29 October 2019, 19 November, Vicenza, Italy (in Italian language)
Advanced and expert level courses will be launched in 2020.

Registration and additional information
Central registration
Training Center for Fiber Composite Technology
Fraunhofer Institute for Manufacturing Technology and Advanced Materials IFAM
Wiener Straße 12 | 28359 Bremen | Germany
Register online via www.lightweightprofessional.com

Michaela Müller
E: register@ifam.fraunhofer.de
T: +49 421 2246 431 | Fax +49 421 2246 605

Materials for Lightweight Design - How to Treat them Right
Lightright

The appropriate handling of raw materials in lightweight design structures is the key success factor for preserving resources and reducing costs. Industry gets this know-how in Lightweight Professional courses. The courses, based on results from a recent Europe-wide survey, have been designed to meet industrial needs in this sector.

Light alloys
Cast iron
Fibre reinforced material
Magnesium
High strength steels
Plastics
Powder metals
Joining techniques
Testing
Recycling

Lead partner:
Fraunhofer
### The World of Perlite - Overview

**ECLC ProSchool**

**Overview**

- This course provides an overview of perlite.

**Target**

- Students, PhD candidates of Materials Science investigating for materials with specialised properties and applications.
- Professionals with a technical background (engineers, chemists etc), who want to enter the perlite sector.
- Professionals with economic and/or marketing backgrounds, who need to understand the key characteristics of perlite to facilitate their business.

**Objective**

- Participants will become familiar with perlite as an industrial mineral and its applications.
- They will also become familiar with the peculiarities of the expansion process for the different qualities of perlites in each sector of final application.

**Type of training**

Classroom.

**Content**

From the beginning of the course each participant will declare his/her interests regarding the applications of perlite – end uses and markets.

Thus, for each session there will be an initial presentation, that will generate questions and discussions. For activating learning and increasing the effectiveness of teaching additional information and guidelines will be provided.

The duration of the course is one day.

**Language**

English.

**Course Instructors**

- **Dr. Antonia Ekonomakou**, Mining & Metallurgy Engineer, PhD in Ceramic Materials Science.
- **Achilleas Amanatidis**, Mining and Metallurgy Engineer.

**Fees**

- **800€**
- **600€** for EIT RawMaterials Members

Includes catering.

Fees are subject to change. Please check our website for the latest information.

**Date & location**

29 May 2019 | 19 Nov 2019

For the latest dates, please visit our online catalogue at rawmaterialsacademy.eu/lifelonglearning

**Registration and additional information**

E: willem.zank@eit.tu-freiberg.de
W: courses.eitrawmaterials.eu

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### The World of Perlite - Innovative Applications

**Sustainable Follow-Up RM ProSchool**

**Overview**

- An overview of the innovative applications of perlite is provided. Fundamentals of markets, market trends, competitive materials will be presented.

**Target**

- PhD candidates of Materials Science investigating for materials with specialised properties and applications.
- Professionals with a technical background (engineers, chemists etc), who want to enter the sector of the advanced applications of perlite.

**Objective**

- Professionals with economic and/or marketing backgrounds, who need to understand the key characteristics of perlite to facilitate their business.

**Type of training**

Classroom.

**Content**

- Participants will become familiar with perlite as an industrial mineral and its applications.
- They will also become familiar with the peculiarities of the expansion process for the different qualities of perlites in each sector of final application.

From the beginning of the course each participant will declare his/her interests regarding the applications of perlite – end uses and markets.

Thus, for each session there will be an initial presentation, that will generate questions and discussions. For activating learning and increasing the effectiveness of teaching additional information and guidelines will be provided.

The duration of the course is one day.

**Language**

English.

**Course Instructors**

- **Dr. Antonia Ekonomakou**, Mining & Metallurgy Engineer, PhD in Ceramic Materials Science.
- **Achilleas Amanatidis**, Mining and Metallurgy Engineer.

**Fees**

- **800€**
- **600€** for EIT RawMaterials Members

Includes catering.

Fees are subject to change. Please check our website for the latest information.

**Date & location**

30 May 2019 | 20 Nov 2019

For the latest dates, please visit our online catalogue at rawmaterialsacademy.eu/lifelonglearning

**Registration and additional information**

E: willem.zank@eit.tu-freiberg.de
W: courses.eitrawmaterials.eu
Circular Economy Innovation
ECLC ProSchool

Overview
Learn how to develop and create circular products, materials, and technologies for this billion-euro megatrend industry with state-of-the-art innovation techniques.

Target
- R&D and innovation managers, sustainability professionals, supply-chain managers
- Engineers, technicians, and scientific users in the field of product and material development, and industrial production, and recycling
- Career changers from various fields
- Engineers, and managers who want to develop future-proof circular solutions for B2B or B2C

Objective
Participants will discover a superior way of developing and creating sustainable products, materials, services, and technologies.

They will learn about Circular Economy Innovation, a state-of-the-art approach for understanding linear problems and developing sustainable solutions. They will be able to assess new innovations on their sustainability and business values, and know how to apply circular economy principles to a process or product chain.

Type of training
Classroom, Group work.

Content
- Current circular economy approaches and labels
- Best and worst practice cases covering products, materials, and services
- How to detect and understand linear problems
- Learn about practical tools, guidelines, and circular assessments
- How to develop sustainable circular solutions
- Practical session: Circular product and material development

Language
English.

Course Instructors
Dr David Schönmayr, expert in the field of corporate sustainability and circular economy.

Fees
€790
€600: EIT RawMaterials partners
Fees are subject to change. Please check our website for the latest information.

Date & location
15 May 2019, 09:00 - 17:00, Montanuniversitaet Leoben
20 September 2019, 09:00 - 17:00, Montanuniversitaet Leoben
For the latest dates, please visit our online catalogue at rawmaterialsacademy.eu/lifelonglearning
Additional locations may be available upon request.

Registration and additional information
Anja Meier, BA
E: anja.meier@unileoben.ac.at
W: courses.eitrawmaterials.eu

Lead partner:

CIRCULAR ECONOMY
DESIGN OF PRODUCTS AND SERVICES FOR THE CIRCULAR ECONOMY
Designing smarter solutions, closing material loops
Competitive Sustainable Business from Metal Recycling
BizMet Academy

Overview
The course will spread and expand the knowledge amongst university students and professionals of the trade on technology, sustainability and business models, such as circular economy and industrial symbiosis of the metal recycling and urban mining.

Target
University students (PhD and MSc level), teachers and researchers, industrial professionals and other stakeholders interested in metal recycling and circular economy.

Objective
The trainees will be able to:
- Understand how to implement circular economy in the utilisation of secondary metal raw materials.
- Evaluate the challenges of metal recycling, urban mining, circular economy and industrial symbiosis in general.
- Identify regional differences in metal recycling value chains.
- Apply technology, sustainability and business models on the competitiveness of a product/process/service.
- Analyse and understand the effects of extended producer responsibility in circular economy.
- Identify the technological and business opportunities in the multiple value chains of the trade and design value chains with minimum environmental impact.

Type of training
Classroom, E-learning, Blended learning.

Language
English (prerequisite).

Fees
None.

Date & location
For details visit rawmaterialsacademy.eu/lifelonglearning

Registration and additional information
Jutta Nuortila-Jokinen
E:jutta.nuortila-jokinen@lut.fi

Engineering Design for a Circular Economy
MOOC- EdfCE

Overview
This Massive Open Online Course (MOOC) provides learning about four different approaches to designing a product for a circular economy. These approaches are Reuse, Repair, Remanufacturing and Recycling.

Target
Newcomers and professionals in product design, and anyone who is interested in the topic. No academic degree required.

Objective
Participants will gain an awareness of the need to consider the circular economy during the design process of new products.

Type of training
MOOC

Content
- Introduction to the circular economy.
- Engineering Design for Reuse.
- Engineering Design for Repair.
- Engineering Design for Remanufacturing.
- Engineering Design for Recycling.

Language
English (prerequisite).

Course Instructors
Armin Lohrangel, Max Prumbohm, TU Clausthal.
David Peck, Juan Azcarate Aguirre, TU Delft.
Ester van der Vost, Leiden University.
Anna-Karin Jonbrink, Swerea.

Fees
Free

Date & location
Duration: 6 weeks with around 2 hours of work per week.

Registration and additional information
For details visit rawmaterialsacademy.eu/lifelonglearning.
Simulation-Based Footprint of Technology
Sustainable Follow-Up RM ProSchool

Overview
Metallurgy is a key enabler of a circular economy (CE). Its digitalisation is the metallurgical Internet of Things.

Objective
Participants will be able to:
- Flowsheet physical separation, metallurgical and recycling systems through hands-on use of simulation software (HSC Sim) – various systems will be explored.
- Evaluate the resource efficiency of these flowsheets e.g. using exergy, Life-Cycle Assessment (LCA) tools and thus linking simulation and footprinting.
- Acquire knowledge about the use of English terms in non-ferrous process metallurgy as well as physical recycling in addition to design for recycling.
- Link bills of materials of products to metallurgical recovery.

Type of training
The course combines classroom lectures with case studies and practical simulation with HSC SIM (www.outotec.com) and GaBi (www.thinkstep.com).

Content
The course provides an overview of concepts and introduction to cases to be solved using simulation tools, working out a case from end-of-life product to metal recovery. Also covered is analysis of results and recommendations.

Language
English (prerequisite).

Course Instructors
Prof. Dr. Dr. h.c. Markus Reuter, Helmholtz Institute Freiberg for Resource Technology, Honorary Professor at TU Bergakademie Freiberg.

Fees
€1,138 for EIT RawMaterials partners
€1,538 for external partners.
Course fees include catering and learning materials.
Fees are subject to change. Check our website for the latest information.

Date & location
Dates: See our online calendar at rawmaterialsacademy.eu/lifelonglearning
Location: EIT RawMaterials - Regional Center Freiberg, Germany. Additional locations may be available on request.

Registration and additional information
E: event@eit.tu-freiberg.de
W: courses.eitr-freiberg.de/EIT/
CROSS VALUE CHAIN

Bring your tech to the market

RMTechFlow

Overview
A 1.5 day top-level hands-on course to train researchers and scientists in creating impact out of research results in the raw materials field via IP licensing or new ventures.

Target
Research personnel (including PhDs and postdocs) from universities or research centres, especially those involved in upscaling projects. Applicants must bring an IP/technology case (TRL min 4) that they wish to bring to the market.

Objective
Trainees will:
- Understand how to perform IP ownership clearance.
- Understand how to search for prior art and position owned technology.
- Find viable applications for their technology.
- Learn how to describe and analyse their innovation from a market and industry perspective.
- Learn how to formulate key hypotheses on market needs to enable actionable validation.
- Learn how to identify business opportunities by assessing current and future market needs.
- Learn how to establish and validate the viability of business opportunity ideas.
- Learn how to incorporate cooperation and feedback mechanisms involving TTO personnel, potential clients, investors and final users.
- Learn how to build a team to develop business opportunities around the initial idea.

Type of training
Classroom.

Content

Module 1: Position your Technology: First Steps in Commercialisation of your Research
Topics covered include:
- drivers of innovation and the main phases of the technological innovation process
- what is innovation and what is open innovation
- SCAMPER analysis of your tech
- resources to evaluate tech trends: S-curve/Gartner Hype Curve/ Magic quadrant
- searching for prior art beyond publications
- TRL vs market readiness
- IP ownership clearance and due diligence
- IP protection options: patents

Module 2: Market driven research: Transform your IP into key industry factors of interest
Topics covered include:
- what is market-driven research and development, and how is it applied in industry and research?
- the break-down of IP into an easy market communicable tech brief; describing what IP is and what it does in 30–50 words
- describing the basic need of the IP; identifying the features and benefits of your IP
- making a first competitive benchmarking of your IP
- testing the Customer Readiness Level maturity of your IP
- building and refining hypotheses of use areas and potential target markets
- finding validators and constructing core questions: capturing the necessary
- conducting interviews, iteration and conclusion on next steps

Module 3: Generating impact out of R&D: how to maximise the commercial results of R&D
Topics covered include:
- identification of potential technology-based business ideas: how do we identify new ideas?
- working with TTO personnel: the key to market-oriented research
- potential impacts of R&D (business model, current and future competitors, financial/market/legal risks, the need for a business plan, etc.)
- the entrepreneurial ecosystem and the communication mechanisms necessary for successful technology transfer
- building the team for the development of the business opportunity
- different commercialisation models
Eco-innovations: Challenges and Innovation Development for SMEs

RefresCO

Overview

The course allows participants to become eco-innovators whatever their role. They will learn to manage the implementation of innovative ideas which depend not only on technological knowledge but also on managerial and entrepreneurial skills and a market and policy environment analysis.

Target

The workshop targets representative from various fields, such as technical fields, business, management and administration, universities, as well as associations.

Objective

The course aims to prepare participants to become more effective eco-innovators no matter where they reside in an organisation.

Type of training

Blended learning.

Content

- Eco-Innovation Strategy: Competitive Advantage Creation Process, to apply methods for understanding what an organisation wants and can achieve through eco-innovating new product/service/process/business model innovation, and how it can create competitive advantage and value for the organisation.
- Innovation Eco-system: in order to audit the eco-system, technical, management and organisation skills are needed for eco innovation.
- Innovation Eco-system Management: in order to integrate diverse approaches and people to create eco-innovative products, processes or business models.

Language

English.

Course Instructors

Esztella Fazekas an independent consultant who with more than 10 years progressive professional experience in the profit and non-profit sector. She has a background in international development, tendering and contracting, programme management, project and business administration and marketing. Overseas and international work experience includes South America, Central and Southern Europe and the Southern Caucasus.

Fees

Please contact info@refrescoeitrm.eu for details of bespoke training options.

Date & location

The course is on-demand.

Registration and additional information

E: info@refrescoeitrm.eu
W: elearning.enea.it/login/index.php

Lead partner:

RefresCO
Introduction to P5 Impact Analyses – Integrating Sustainability into Project Decisions
ECLC ProSchool

Overview

Project decisions are often based on cost, making it difficult to justify inclusion of hard-to-measure social and environmental considerations into project assessments. For this reason, the P5 Impact Analysis was designed to incorporate People, Planet, Profit, Process and Product aspects, influencing ultimate decisions and recommendations for project components.

Target

This course is best suited for Engineers, Assessment Professionals & Project Stakeholders:
- With less than 5 years of experience industry
- Who want to influence the decision-making process
- Who desire a transparent, communicable method of working with multiple disciplines to include environmental and social considerations into project design.

Objective

After taking this course, participants will:
- Have a good understanding of mining-relevant 5Ps: People, Planet, Profit, Process & Product, and how each align with ISO standards, the Sustainable Development Goals, the UN Global Compact Guiding Principles, and GRI Sustainability Reporting Guidelines.
- Have a transparent framework to engage multi-discipline teams in dialogue about 5P issues.
- Be able to perform high-level gap assessments on their current projects regarding 5P issues, to help justify inclusion of sustainability-related, longer-term risks in the decision-making process.
- Understand how the P5 analysis framework can be used to compare design and process options for all types of projects, with multi-discipline, multi-stakeholder teams.

Type of training

Classroom.

Content

The course will be taught in person, in a group setting over the course of one day, with a large proportion of time dedicated to applied and interactive exercises. Hands-on learning is the best strategy for everyone to fully comprehend lessons, as well as to be able to repeat the processes on their own projects, and as such more than half of the class duration will involve active, applied work within the class.

Problem relevancy and solution guidance will be conveyed somewhat lecture style, with opportunities for dialogue during these short segments. Lecture periods will be interspersed with instructor-led, independent work, one-to-one and group discussions, and interactive, inclusive exercises. Presentation opportunities will be available to those who are comfortable with this format.

Exercises will include:
- Short exercises to help engage the class at the start, and encourage recognition of differing perspectives, knowledge and experiences.
- Extended table discussions around the 5Ps for particular examples, to help gain a full appreciation of how these relate to real projects, at various lifecycle stages of the proposed development.
- Staged and directed brainstorming around various options for an example project component, including related risks and requirements, and possible concerns or benefits, utilising checklists and examples.
- Extended small group discussions to assess an example problem, and develop a list of potential preventative or corrective measures to improve sustainability performance.
- Classroom discussion on the various results of each smaller group.

Language

English (prerequisite).

Course Instructors

Karen Chovan is the Principal of Enviro Integration Strategies.

Fees

€800
€600 for EIT RawMaterials partners
Includes catering.

Date & location

23 May 2019, 14 October 2019, Freiberg, Germany
For the latest dates, please visit our online catalogue at rawmaterialsacademy.eu/lifelonglearning
Additional locations may be available upon request.

Registration and additional information

Willem Zank
E: willem.zank@eit.tu-freiberg.de
W: courses.eitrawmaterials.eu
CROSS VALUE CHAIN

Introduction to Reporting in the Mineral Industry
ECLC ProSchool

Overview
This is an introductory course on the international policies, reporting frameworks, standards, good practices and guidelines for mineral projects and assets.

Target
The course’s intended audience includes:
- Managers of mining and exploration companies.
- Investment advisors and investment banking executives (e.g., fund managers), investors and potential investors in the extractive industry.
- Graduate and postgraduate geology and mining students aiming to pursue a career in mining finance.

Objective
Participants in the course will learn to:
- Understand international reporting standards for the mineral industry.
- Implement transparency in the mining industry through complete and accurate reporting by companies to the markets and society.

Content
The course is presented in two segments in one day.
Morning:
- Mapping reporting standards and guidelines for the mining industry
- Reporting to the market: Resources and Reserves
- Reporting to the market: Project valuations
- Case analysis and discussion

Afternoon:
- Reporting to society: Sustainability
- Reporting to society: Mine Closure
- Reporting to society: Responsible Sourcing
- Reporting to society: Indigenous people and local communities
- Reporting to society: Critical Raw Materials
- Case analysis and discussion

Type of training
Classroom, Computer, Group work, Self study.

Language
English is the default language. The course may also be taught in Portuguese (please enquire).

Fees
€800
€600 for EIT RawMaterials partners
Price includes a catering package.
Fees are subject to change. Please check our website for the latest information.

Date & location
5 June 2019, Freiberg
3 October 2019, Freiberg
For the latest dates, please visit our online catalogue at rawmaterialsacademy.eu/lifelonglearning.

Registration and additional information
Willem Zank
E: willem.zank@kit.tu-freiberg.de
W: courses.eitrawmaterials.eu/

Lead partner:

P5 Impact Analyses – Holistic Decision Making to Improve the Triple Bottom Line
Sustainable Follow-Up RM ProSchool

Overview
P5 stands for People, Planet, Profit, Process & Product. The P5 Impact Analyses is a tool that can be utilized to assess and compare options for various project components, to facilitate making sustainability-informed decisions and recommendations for the best possible outcomes of a project, aligned with the SPIs.

Target
This course is best suited for Project Managers, Engineers & Assessment Professionals:
- With 5 or more years of experience in the mining sector.
- Who desire a justified means to incorporate environmental and social considerations into planning, design and operations of future projects.
- Who desire a transparent, communicable method of assessing and comparing design options.

Objective
After taking this course, participants will:
- Have a good understanding of mining-relevant SPIs: People, Planet, Profit, Process & Product, and how each align with ISO standards, the Sustainable Development Goals, the UN Global Compact Guiding Principles, and GRI Sustainability Reporting Guidelines.
- Have a transparent framework to engage multi-discipline teams in dialogue about SPI issues.
- Be able to perform high-level gap assessments on their current projects regarding SPI issues.
- Be able to utilize the 5P analysis framework to compare design and process options for all types of projects, with multi-discipline, multi-stakeholder teams.
- Be able to demonstrate how and why a decision was made between project options.

Type of training
Classroom, Group work.

Content
The course will be taught in person, in a group setting over the course of one day, with a large proportion of time dedicated to applied and interactive exercises. Hands-on learning is the best strategy for everyone to fully comprehend lessons, as well as to be able to repeat the processes on their own projects, and as such more than half of the class duration will involve active, applied work within the class.

Problem relevancy and solution guidance will be conveyed somewhat lecture style, with opportunities for dialogue during these short segments. Lecture periods will be interspersed with instructor-led, independent work, 1-1 and small group discussions, and interactive, inclusive exercises. Presentation opportunities will be available to those who are comfortable with this format.

Exercises will include:
- Short exercises to help engage the class at the start, and encourage recognition of differing perspectives, knowledge and experiences.
- Extended table discussions around the SPIs for particular examples; to help gain a full appreciation of how these relate to real projects.
- Staged and directed brainstorming around various options for an example project component, including related risks and requirements, and possible concerns or benefits, utilizing checklists and examples.
- Extended small group discussions to compare and contrast, then rank potential solutions for an example problem, taking into account the numerous requirements, pros and cons of each.
- Presentation and comparison of results from various “teams” in the classroom, should there be a sufficient number of registrants.

Language
English.

Course Instructors
Luís Chambel, Mining Engineer, MBA, MSC Engineering Geology, PhD Engineering Sciences
Teresa Burguete, Mining Engineer, MBA, MSC Mining Engineering, PhD student

Willem Zank
E: willem.zank@kit.tu-freiberg.de
W: courses.eitrawmaterials.eu/
### Project Optimisation & Risk Minimisation for Responsible Resource Developments

**Title:** Sustainable Follow-Up RM ProSchool

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#### Overview

Many proponents in the extractive sector are experiencing extended permitting delays or denials due to opposing stakeholders. To reduce risks causing such external concerns and delays, a front-end planning and mapping framework is proposed to increase the visibility and understanding of complex systems, improve communications, and facilitate collaboration between multi-discipline stakeholders.

#### Target

This course is best suited for Project Managers, Engineers & Assessment Professionals who:

- Have 5 or more years of experience in mining.
- Want to avoid re-work &/or change requests stemming from external stakeholders.
- Desire a better means to communicate and manage the complexities and system-based risks associated with mining developments.

#### Objective

After taking this course, participants will:

- Understand and be able to identify project requirement types, as well as the risks associated with long-term and integrated project development lifecycles.
- Understand how to discover systems-based risks and improvement opportunities.
- Have the means to identify relevant project stakeholders, including those who might introduce less obvious requirements of their own.
- Have a basis for better communication to create and/or improve alignment on the actual and entire scope of the project, including the multiple project objectives of all involved stakeholders.
- Have a means to collaboratively assess & optimise process flows through value stream mapping and other lean processes.

#### Type of training

- **Classroom, Group work.**

#### Content

The course will be taught in person, in a group setting over the course of two days, with a large proportion of time dedicated to applied and interactive exercises. Hands-on learning is the best strategy for everyone to fully comprehend lessons, as well as to be able to repeat the processes on their own projects, and as such more than half of the class duration will involve active, applied work within the class.

Problem relevance and solution guidance will be conveyed somewhat lecture style, with opportunities for dialogue during these short segments. Lecture periods will be interspersed with instructor-led, independent work, one-to-one and group discussions, and interactive, inclusive exercises.

Exercises will include:

- Short exercises to help engage the class at the start, and encourage recognition of differing perspectives, knowledge and experiences.
- Staged and directed brainstorming around project components, risks and requirements, utilising checklists and examples, to help identify scope of a project, as well as increase recognition of knowledge & experience of a “team”.
- Affinity mapping of project components and identifying interrelated functions, to understand complexity of the system.
- Value stream mapping of the project development/evaluation milestones and the relations between multiple teams, to highlight how many stakeholders are typically involved throughout the lifecycle of a project.
- Optimisation exercise to practise how we might prioritise work and discover alternative solutions for better environmental performance and social acceptance.
- Small group exercises to analyse example project components, to help participants understand how to identify the necessary information required for design, as well as which stakeholders to engage, to identify appropriate options to assess for said component.

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#### Lead partner:

**Overview**

<table>
<thead>
<tr>
<th>Course Instructors</th>
<th>Karen Chovan, Principal of Environ Integration Strategies.</th>
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<tr>
<td>Fees</td>
<td>€800 for EIT RawMaterials partners</td>
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<tr>
<td>Registration and additional information</td>
<td>Willem Zank</td>
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<td>E: <a href="mailto:willem.zank@eit.tu-freiberg.de">willem.zank@eit.tu-freiberg.de</a></td>
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<td>W: courses.eitrawmaterials.eu/</td>
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#### Project Optimisation & Risk Minimisation

**Title:** Sustainable Follow-Up RM ProSchool

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#### Overview

Many proponents in the extractive sector are experiencing extended permitting delays or denials due to opposing stakeholders. To reduce risks causing such external concerns and delays, a front-end planning and mapping framework is proposed to increase the visibility and understanding of complex systems, improve communications, and facilitate collaboration between multi-discipline stakeholders.

#### Target

This course is best suited for Project Managers, Engineers & Assessment Professionals who:

- Have 5 or more years of experience in mining.
- Want to avoid re-work &/or change requests stemming from external stakeholders.
- Desire a better means to communicate and manage the complexities and system-based risks associated with mining developments.

#### Objective

After taking this course, participants will:

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- Understand how to discover systems-based risks and improvement opportunities.
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- Have a basis for better communication to create and/or improve alignment on the actual and entire scope of the project, including the multiple project objectives of all involved stakeholders.
- Have a means to collaboratively assess & optimise process flows through value stream mapping and other lean processes.

#### Type of training

- **Classroom, Group work.**

#### Content

The course will be taught in person, in a group setting over the course of two days, with a large proportion of time dedicated to applied and interactive exercises. Hands-on learning is the best strategy for everyone to fully comprehend lessons, as well as to be able to repeat the processes on their own projects, and as such more than half of the class duration will involve active, applied work within the class.

Problem relevance and solution guidance will be conveyed somewhat lecture style, with opportunities for dialogue during these short segments. Lecture periods will be interspersed with instructor-led, independent work, one-to-one and group discussions, and interactive, inclusive exercises.

Exercises will include:

- Short exercises to help engage the class at the start, and encourage recognition of differing perspectives, knowledge and experiences.
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- Small group exercises to analyse example project components, to help participants understand how to identify the necessary information required for design, as well as which stakeholders to engage, to identify appropriate options to assess for said component.
Project Optimisation & Risk Minimisation for Responsible Resource Developments

Language
English

Course Instructors
Karen Chovan, Principal of Enviro Integration Strategies.

Fees
€1500
€1200 for EIT RawMaterials partners
Includes catering.
Fees are subject to change. Please check our website for the latest information.

Date & location
27-28 May 2019
17-18 October 2019
Freiberg, Germany
For the latest dates, please visit our online catalogue at rawmaterialsacademy.eu/lifelonglearning
Additional locations may be available upon request.

Registration and additional information
E: willem.zank@eit.tu-freiberg.de
W: courses.eitrawmaterials.eu

Lead partner:

Overview
This course offers a hands-on approach and will show you how to unlock the power of Earth Observation services for your company, organization or research institution to 1. Secure primary and secondary mineral and material resources needed to transition to a sustainable and circular economy, and 2. Monitor environmental impact and increasing safety.

Target
- R&D industrial managers across the value chain, from large industry, SMEs and start-ups
- Senior management in industries across the value chain
- Development experts from government agencies
- Scientists and researchers in EU and governmental agencies
- Environmental experts
- Geoscientists
- Doctoral and post-doctoral researchers

Objective
Participants will:
- Understand the importance of mineral resources for a sustainable society and the opportunities emerging from Earth Observation (EO) systems;
- Acquire the basics of Earth observation and remote sensing technology with an emphasis on the Copernicus programme and its services;
- Learn the use of free software for spaceborne image processing, with practical applications;
- Identify and map the primary and secondary mineral resources using Earth Observation data;
- Assess and monitor environmental impacts of mining activities using Earth Observation.

Type of training
Classroom, Excursions, Computer.

Content

Module I: Raw Materials Challenges and Copernicus
Lectures on:
- Raw materials industrial and societal challenges facing Europe and the role of Copernicus to tackle these challenges.
- Earth Observation landscape and services for the raw materials sector.
- Smarter, cost-effective solutions for raw materials exploration and mining + optimized ways to monitor environmental impact and increase safety.

Technical lectures on:
- The basics of imaging technology.
- Optical and active remote sensing.
- Remote sensing in raw materials context.
- Copernicus data and open-source software used for the course.

Module II: Raw Materials & Mineral Resources Supply
This module will explore how to unlock the power of Earth Observation data tools for raw materials and mineral resources exploration and highlight their efficiency and cost-effectiveness via hands-on exercises in small groups using Copernicus data tools and techniques in case studies:
- Iron oxide copper gold mineralization exploration in the Arctic
- Critical raw materials exploration in tailings

Module III: Environmental Impact Monitoring
This module will explore how Earth Observation data can boost environmental impact monitoring of your company and/or organization via group work using Copernicus data tools directly on three case studies that illustrate the potential of EO data for the monitoring of environmental impacts from mining activities:
- Alluvial gold mining.
- Contamination monitoring of open pit mining activities.
- Ground stability monitoring.
Reporting in the Mineral Industry - Resources & Reserves, Asset Valuation, Sustainability and Social Responsibility

Overview
This course presents and discusses the international policies, reporting frameworks, standards, good practices and guidelines for mineral projects and assets.

Target
The intended audience includes:
- Managers of mining and exploration companies.
- Investment advisors and investment banking executives (e.g. fund managers), investors and potential investors in the extractive industry.
- Graduate and postgraduate geology and mining students aiming to pursue a career in mining finance.

Objective
Participants in the course will learn to:
- Understand international reporting standards for the mineral industry.
- Implement transparency in the mining industry through complete and accurate reporting by the companies to the markets and society.

Type of training
Classroom, Computer, Group work, Self study.

Content
This course is presented in six modules (three days, two 3-hour parts each day):

Day 1
Morning: Mapping reporting standards and guidelines for the mining industry.
Reporting to the market: Resources and Reserves
Afternoon: Case analysis and discussion.

Day 2
Morning: Reporting to the market: Project valuations. Reporting to society: Sustainability
Afternoon: Reporting to society: Mine Closure. Case analysis and discussion.

Day 3

Language
English is the default language. The course may also be taught in Portuguese (please enquire).

Course Instructors
Luís Chambel, Mining Engineer, MBA, MSC Engineering Geology, PhD Engineering Sciences
Teresa Burguete, Mining Engineer, MBA, MSC Mining Engineering, PhD student

Fees
€1800
€1500, EIT RawMaterials partners
Price includes a catering package.
Fees are subject to change. Please check our website for the latest information.

Date & location
25-27 June 2019, Freiberg
29-31 October 2019, Freiberg
For the latest dates, please visit our online catalogue at rawmaterialsacademy.eu/lifelonglearning
Additional locations may be available upon request.

Registration and additional information
Willem Zank
E: willem.zank@eit.tu-freiberg.de
W: courses.eitr rawmaterials.eu

Lead partner: ECLC ProSchool
## Soft Skill Leadership and Prevention of Crisis
### ECLC ProSchool

**Overview**
Today’s leaders need to learn not only technical skills but also the importance of how these skills and company goals are delivered to subordinates through a professional leadership style.

**Target**
Those holding or preparing for leadership roles - like leading a team along a project or managing people via their assigned function in an organisation.

**Prerequisites**: Experience with teamwork and/or leadership.

**Objective**
Participants will gain an understanding of a leadership style with a “soft skill” approach, and why this is essential nowadays in order to keep employees motivated and assure competitiveness. They will obtain tools to better understand team members and how to keep the momentum of a motivated team alive.

Participants on this course will gain understanding of the advantage of a soft skill leadership style and how this style can best be used – while respecting a “360” consideration of a task and the people involved.

Based on practical examples, participants are guided towards the target of knowing how to get the necessary personal “input” from their team and being able to adapt their “output” as leadership style in order to successfully follow the working goal as a team or a company.

**Type of training**
Classroom, Self study.

**Content**
- Based on real industrial examples: analyses of severe issues which could have been avoided upfront.
- Developing a practical manual about best interaction with manager, subordinates, authorities, neighbourhood, environment, media.
- The process of teambuilding.
- Personality type and behaviour pattern analysis.
- Definition of soft skills and why they are important.
- Leadership styles (and which kind of style we want). Conflict behaviour analyses.
- Management tools to make sure the team follows its goals.

**Language**
English (prerequisite).

**Course Instructors**
Dipl Ing. Bernhard Jedlitschka, CE Jedlitschka

**Fees**
€600 for EIT RawMaterials, €780 for external partners.

**Date & location**
TBC. Check our online catalogue at rawmaterialsacademy.eu/lifelonglearning

**Registration and additional information**
W: courses.eitrawmaterials.eu/EIT/
Spring School on Circular Economy
RaMa-SCENE & IDS-FunMat-INNO

Overview
The School educations PhDs and professionals on what the circular economy is, and how it can be assessed and implemented.

Target
PhD Students, sustainability professionals and EIT alumni

Objective
- Trainees will gain a basic understanding of the value chain of raw materials including exploration, mining, processing, materials selection and development, manufacturing, use and end-of-life options (including recycling).
- Trainees will understand different environmental systems analyses including LCA, MFA and IOA, that enable assessment of the impacts of materials use and circular economy improvements.
- Trainees will understand how the impacts of circularity options benefit society in economic and environmental terms using the RaMaScene screening tool.
- Trainees will understand the societal relevance of moving to a circular economy, the transition challenges such changes pose, and which policy approaches are useful.
- Trainees will understand the pros and cons and the challenges and opportunities of pursuing a career in sciences at universities, realiseing tenure via a series of post-doc positions, and students will be supported in making a well-founded choice of which type of career to pursue.
- Trainees will understand which grant systems typically are available to support early stage career researchers after their PhD, and what it takes to write a successful proposal for this.

Type of training
Classroom

Content
- Circularity assessment and modelling with RaMaScene (CML)
- Circular economy policies (KU Luven)
- PhD exchange, career counselling and grant writing (CML and University of Bordeaux)

Language
English

Course Instructors
Teachers are from Leiden University, KU Luven, University of Bordeaux and TU Delft

Fees
Free attendance
Lunches and refreshments (e.g. tea and coffee) during the school are provided. Accommodation, breakfast and dinners are at participants’ own expense, except for pre-admitted PhD students. Any extras in the hotel or elsewhere are at participants’ own expense.

Date & location
8-11 April 2019
Van Steenis building, Einsteinweg 2
2333 CC Leiden, The Netherlands

Registration and additional information
E: tukker@cml.leidenuniv.nl

Lead partner:

The Excellent Tech Transfer Office
RMTechFlow

Overview
A 1.5 day top-level hands-on course for technology transfer personnel on the most effective approaches to create successful tech transfer cases out of research results in the Raw Materials field.

Target
Personnel employed at technology transfer offices of universities and research centres, innovation managers etc.

Objective
- Trainees will gain a wider understanding of the roles of a Tech Transfer Office
- Learn about common challenges and best practices in roles, processes, tools and methods for the key activities performed by a Tech Transfer Office
- Understand best practices in how to enable continuous improvement of a Tech Transfer Office organisation
- Enable benchmarking of their own organisation to learn where improvements can be made
- Become aware of their tech transfer environment and set objectives accordingly
- Learn about different valuation methods
- Prepare an effective pitch for their business idea
- Gain an understanding of IP exploitation strategy
- Understand key factors to identify opportunity of spinout vs license
- Learn about raising investment for spinouts
- Understand what companies look for in R&D collaboration / licensing
- Develop advanced negotiation skills
- Gain an understanding of the right exploitation strategy: How to license to corporate and when to launch a new venture

Type of training
Classroom, Group work.

Content
Module 1: The Impactful TTO: How to organise your Tech Transfer activities
Topics covered:
- Setting the scene: The holistic role of a Tech Transfer Office and its stakeholders - learnings and framework from a high innovation performing Nordic region.
- Promoting new ideas and collaborations - Challenges and best practices in creating market pull
- IP inflow generation - Challenges and best practices in capturing early tech ideas
- Initial assessment - Prioritising and assessing efforts in the IP portfolio
- Challenges, best practices and success criteria in TTO governance, roles and continuous learning

Module 2: Building the Business Case: How to develop tech transfer cases out of market needs
Topics covered:
- Factors to be kept in mind when valuating technology (Technology, Market, Legal, Strategic)
- Valuation of IP (Cost method, Market method, Options method, Income method)
- Types of investors
- Preparation of a pitch (the questions you should be answering)

Module 3: The right exploitation strategy: How to license to corporate and when to launch a new venture
Topics covered:
- Different exploitation paths
- Licensing options; when it is better to license and criticalities; legal aspects
- How to negotiate R&D collaboration and licence: from start to end
- When it is better to spin out and criticalities
- How to raise of private investment; how to engage and interact with investors

Language
English

Course Instructors
Teachers are from Leiden University, KU Leuven, University of Bordeaux and TU Delft

Fees
Free attendance
Lunches and refreshments (e.g. tea and coffee) during the school are provided. Accommodation, breakfast and dinners are at participants’ own expense, except for pre-admitted PhD students. Any extras in the hotel or elsewhere are at participants’ own expense.

Lead partner:
## CROSS VALUE CHAIN

### The Excellent Tech Transfer Office

<table>
<thead>
<tr>
<th>Language</th>
<th>English</th>
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<td>Course Instructors</td>
<td>See rmtechflow.eitrawmaterials.eu</td>
</tr>
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<td>100€ for externals.</td>
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<td>Partners involved in upscaling projects can utilise part of their project budget to cover travel costs to the course. Fees are subject to change. Please check our website for the latest information.</td>
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<td>most likely October 2019, Berlin, Germany (TBD)</td>
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<td></td>
<td>21-22 November 2019, Cracow, Poland</td>
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<td></td>
<td>For up-to-date information visit rmtechflow.eitrawmaterials.eu</td>
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<td>Registration and additional information</td>
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<td>W: rmtechflow.eitrawmaterials.eu</td>
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### Lead partner: HIT
LIFELONG LEARNING COURSES
Strengthening the Raw Materials Sector

EIT RawMaterials GmbH
Europa Center
Tauentzienstr. 11
10789 Berlin, Germany

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of the data contained in the Lifelong Learning Courses catalogue.

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