



**FERROUS METALLURGY**  
**MONTANUNIVERSITAET**



## “Applied methods for LD-converter steelmaking”

**Duration: 15 h** blocked in 3 days: **March (21<sup>st</sup>-23<sup>rd</sup>)**

**Invited Professional:** Dipl.-Ing. **Florian Markus Penz** (K1-MET GmbH and Montanuniversität Leoben)

**Responsible at REDEMAT/NTEC/UFOP:** Prof. D. Sc. Adilson Rodrigues da Costa

**Language:** English

**Description:** The LD converter process is the most important way to transform hot metal to crude steel. An overview of process routes for steel production, fundamental in physics and chemistry for iron and steel metallurgy, raw materials and energy sources for steel production and metallurgical fundamentals of iron ore reduction as well as steelmaking should be a basement for a deeper insight to the process and plant technology of oxygen steelmaking. Practical parts for mass and heat balance of the LD process and the introduction to the work with ternary slag diagrams should introduce the participants to fundamental metallurgical work.

### Topics:

1. Basics of Iron and steelmaking (Duration: 3h; Basics about process routes and description of Iron and Steelmaking processes, physical chemistry, thermodynamics)
2. History of LD Process (Duration: 1h; Historical background of Oxygen steelmaking processes)
3. LD Process (Duration: 3h; Detailed process description, equipment configurations)
4. Mass and Energy balance of LD Steelmaking (Duration: 4h; Interactive exercises; Work out the mass and energy balance for an LD-converter based on a provided Model)
5. Slag metallurgy and applied use of ternary phase diagrams (Duration 3h; discover metallurgical slag types and their subsequent use as a by-product; Interactive exercises - learn how to work with ternary phase diagrams)
6. Overview on LD-Converter modelling. (Duration: 1h; Selected descriptions on LD-Converter modelling and the definition about details where particular focus should be set on)

### References:

1. E.T. Turkdogan, R.J. Fruehan, Fundamentals of Iron and Steelmaking, Chapter 2, AISE Steel Foundation (1999)
2. Turkdogan, E.T., Fundamentals of steelmaking, Institute of Materials, London, 2010.
3. A. Ghosh (Ed.), Ironmaking and Steelmaking: Theory and Practice, PHI Learning Private Limited, Dehli, 2008.



4. Barker, K.J., J.R. Paules, Rymarchyk N. und Jancosko R.M., Oxygen Steelmaking Furnace Mechanical Description and Maintenance Considerations, Chapter 8, AISE Steel Foundation (1998), 431–524.
5. Kondepudi, D., Introduction to modern thermodynamics, Wiley, Chichester, England, Hoboken, NJ, 2008.