

## Online Training

# STEELMAKING – EAF-LF-CC ROUTE COURSE

“Practical knowledge to use in your company”

### Vision

Steelmaking continues to develop technologically, with new steel qualities and high levels of productivity and cost efficiency being fundamental aspects for companies.

The contents of this course offer a good balance between scientific and technological knowledge, and how this knowledge is transferred in its real and practical implementation in an EAF (electric arc furnace) steelworks, showing practical cases. In this way, students will take with them technical criteria and knowledge that they will be able to verify and use in their factories, both to understand the processes and the sequential structure of steelmaking along the EAF-LF refining-Continuous Casting route, as well as to act in an effective way in practice. This course provides attendees with tools to address, identify, understand and overcome the activities, functions and problems that arise in the industrial activity in steelworks, in its different areas or facilities.

This course can benefit any company in the steel sector, or/and anyone who wants to know how steel is manufactured, and the influence on transformed or finished steel products. Practical knowledge, based on technical and technological principles that can be used to improve productivity, maintenance, quality, and provide tools to address situations, understand them and make decisions in a steel mill.

### Training Objectives

In the first place and to obtain a vision of the sector and its socio-economic environment, and of the type of industrial facilities, a global exposition of the state of the steel sector is carried

out, in terms of the market and productions, to understand the strategic and evolutionary vision of the same and of the companies that comprise it.

Next, the metallurgical vision of the steps that are followed in steelmaking, raw materials, and the elements that influence this process, as well as the facilities and equipment that are used, are addressed.

The modules, after the one dedicated to general matters of the sector, are structured following the natural sequence of the process, with the melting of scrap in EAF furnace (electric arc furnace), Ladle Refining and Continuous Casting. These three modules show the key aspects of the process and facilities, productivity, efficiency and costs, and the last includes a description of what a common quality management system looks like under the ISO 9001: 2015 standard in a steel-manufacturing company.

A book or pdf document of this course is not provided, but it is the student who can collect the contents with notes or from the course website.

## Style and Learning

This course is conceived in a practical way, based on the knowledge and technology of steelworks. The content and technical material is explained using a certain visualization in the exposition of the concepts, which the student can identify in their professional environment, and provoking and accepting any discussion or questions that may arise from students through forums, platform messaging, and tutorials promoting addressing all content in an interactive study dynamic.

## ONLINE TRAINING or teletraining

This type of course is called Online Training, and it includes content for 24/7 online training on our platform, platform messaging for any communication and questions, as well as any tutorial session can be asked to develop in a virtual classroom or videoconferencing.

## Virtual Platform

<https://aula.atecid.com>

## Recommendations for the course

The following recommendations seek that the participant can advance through the course continuously, taking advantage of its contents and transforming said contents into their knowledge:

- Try to enter the course daily.
- Try not to accumulate matter for the last days.
- try to dedicate a certain time each day or each week
- participate in forums
- raise your doubts or questions so that the tutor can identify the content to which the student refers
- make sure you do all the assessment exercises

## Monitoring and tutorials

During the expected duration of the course, you will have a tutor to answer your questions or concerns, for which it is necessary to use the platform's messaging system.

The days of videoconference are indicated in the calendar, please consult it, although you will receive a message with the announcement of the day, etc., to connect.

The lecturer in charge of this course is Germán Ghiotti ([link to his LinkedIn](#)) with the collaboration and assistance of Javier Aseguinolaza Iriondo, whose qualifications and experience can be checked in [his LinkedIn profile](#).

## ANNEX. CONTENTS

### Module 1: Vision of Steelmaking

- Vision of Iron and Steel sector
- Global visión of Steelworks
- Energy-environmental vision

### Module 2: EAF

- Introduction to steelmaking
- Steelmaking process chemistry
- Electrodes and Refractories
- EAF process
- Contribution of energy and environment
- EAF parts and operations
- DRI use in an EAF
- Scrap types and optimum mix
- EAF phases
- Dephosphoration and Desulfuration
- Energy Balance
- Productivity and quality

### Module 3: Ladle Furnace Refining

- Process and operations of ladle furnace refining
- Control of slag
- Desoxidation anf alloy adition
- Other aditions and inclusions control
- Control of gases and decarburation
- Homogenization and temperature control
- Refractories
- Productivity and quality

## Module 4: Continuous Casting

- Solidification
- Influences in continuous casting product quality
- Cleanliness defects at ingot foot
- Surface defects
- Internal defects
- Productivity and quality
- ISO 9001:2015 in Steelworks