

SWITCH On Skills

Introduction to Electric Arc Furnace Operations

Steel production via the Electric Arc Furnace route is finding increasing application for producing both long and strip products. This course highlights both the fundamental aspects of the process and its evolution over the last 60 years.

Who Should Attend

This course is specifically designed for individuals interested in electric arc furnace operations in the steel industry. This course suits operators, technicians, engineers, and managers working in steel mills or metal recycling facilities that utilise EAF technology for steel production. It would also benefit individuals new to the steel industry who wish to understand the fundamentals of EAF operations. Additionally, professionals from related fields such as metallurgy, process engineering, and equipment manufacturers seeking to expand their knowledge of EAF operations can attend this training course.

Learning Outcomes

After completing the module, you should be able to demonstrate an understanding of:

- Each stage of both the electric arc furnace process and downstream secondary steelmaking and continuous casting operations
- The various raw materials applied to the furnace and their influence on the chemistry of the products developed.
- The issues and solutions to the problems associated with excessive residual metallic elements and certain gases noted following furnace operations.
- The various options available to maximise steel production rates and reduce both the cost and environmental aspects of the process.

Course Programme

- A description of the architecture of both the furnace and ancillary equipment e.g. power supplies and environmental treatment equipment.
- A review of the role of the various raw materials applied to the furnace i.e. scrap, direct reduced iron, hot briquetted iron, hot metal, lime etc.
- A detailed description of the various heating processes applied to melt the raw materials in the furnace.
- A description of the evolution of the process through a series of iterative steps which have reduced power requirements, tap to tap times and electrode consumption over the last 60 years.

- A description of the chemistry and properties of the product produced via the electric arc furnace steelmaking route.
- The function of various secondary steelmaking processes in enabling the production of a wide range of both long and strip steel products.
- A description of the emissions from furnace operations and the various processes that have been adopted to minimise their environmental impact.
- A comparison of both the advantages and disadvantages of the EAF steelmaking route compared to the blast furnace/BOS steelmaking route.
- A review of the various options that are available to meet the net zero carbon emission steelmaking target date of 2050.

Course Delivery

The course is conveniently delivered through Swansea University's Learning Management System, Canvas, providing a seamless online learning experience. Students are granted a generous three-month period to complete the course, allowing for personalised learning at their own preferred pace.

Throughout the course, participants will engage in three progressive assessment quizzes, complemented by a comprehensive final written assessment that culminates their learning journey. All assessments are conveniently submitted through the secure and user-friendly platform, Canvas.

To ensure a supportive and enriching learning environment, expert guidance and assistance are readily available from our project lecturers and dedicated learning technologists. These experienced professionals can be easily reached through Canvas or via email.

Website: www.now-switch.wales/netzeroskills

Email: fse-netzeroskills@swansea.ac.uk

SWITCH On Skills
Wales' Net Zero Accelerator



POWERED BY
**LEVELLING
UP**