



**Materials
Processing
Institute**



Metallurgy Course

4th to 6th February 2020

COURSE OVERVIEW

The Metallurgy Course provides an excellent understanding of both the science and technology of metals, primarily for carbon and alloy steels. Alongside the classroom lectures will be a number of practical sessions, held in a well-equipped metallographic laboratory.



Practical demonstrations supported by Nikon Metrology

COURSE SPEAKERS:

The course will be delivered by experienced personnel from operational, technical and R&D backgrounds from the Materials Processing Institute. This includes forensic metallurgy, quality assurance, materials testing and characterisation, physical metallurgy, process control and new alloy development.

WHO SHOULD ATTEND

- > Steel Manufacturers
- > R&D Personnel
- > Technologists
- > Quality Control
- > Steel Supply Chain
- > Steel Specifiers and Purchasers
- > PhD/Eng Doc Students

CONTENT

- > Basics of Metallurgy
- > Materials Selection
- > Introduction to Crystallography
- > Phase Diagrams
- > Steel Microstructures
- > Metallography
- > Materials Characterisation
- > Mechanical Properties – definition and testing
- > Steel strengthening mechanisms
- > Heat Treatment
- > Thermomechanical Processing
- > Products and applications

LEARNING OUTCOMES

The course will provide a theoretical and practical understanding of the metallurgy of carbon and alloy steels. The course will ensure an in depth understanding of the properties and tests used to classify steel grades and how the processing of the steel can effect these. An appreciation will be gained for the varied applications of steel and the specific needs of the steel grade design for such applications.

ORGANISATION/REGISTRATION

Materials Processing Institute
Eston Road
Middlesbrough, TS6 6US
United Kingdom
Tel: + 44 (0)1642 382000
email: training@mpiuk.com
Website: www.mpiuk.com/training

COURSE VENUE & FACILITIES

The course will be held at the Materials Processing Institute, Middlesbrough, United Kingdom.

COURSE PRICE

£750 + VAT / Subject to availability.
This price includes lunches and refreshments.

Introduction to Metallurgy

MECHANISMS THAT UNDERPIN PROPERTIES AND PRODUCT APPLICATION INDICATIVE COURSE PROGRAMME

Day 1 - Fundamental Principles Tuesday 4th February 2020

10:00 -16:00

What is a metal

Materials Selection - *Ashby diagrams*

Crystal structures

Phase diagrams

- *Equilibrium Iron Carbon Phase diagram*
- *TTT diagrams*
- *CCT diagrams*

Consideration throughout course on difference between 2 products (Rail and Linepipe)

Day 2 - Chemistry and Mechanisms that influence Properties and how to measure key Properties

Tuesday 5th February 2020

10:00 -16:00

Microstructures

Metallography

- *Optical*
- *Electron*

Strengthening Mechanisms

- *Friction Stress*
- *Solid Solution*
- *Grain Size*
- *Precipitation*
- *Work Hardening*

Mechanical properties – Property definition and measurement technique

- *Strength – stress strain diagram*
- *Hardness*
- *Toughness*
- *Hardenability*
- *Fatigue*
- *Creep*

Day 3 - Processing effect on Properties Wednesday 6th February 2020

10:00 -16:00

Heat Treatment

Thermomechanical Processing

Products, applications and defect assessments

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