ENGINEERING AND TECHNICAL TRAINING

Metallurgy and Materials Engineering

5 day course Classroom, online or in-house

Course overview

Components fail because a material was asked to do something its structure could not support, and the evidence of what happened is usually still present in the broken part. This course builds the understanding to read it. Delegates work through crystal structure, phases and the iron carbon diagram that underlies steel behaviour, heat treatment and the properties each treatment produces, and mechanical property testing including tensile, hardness and impact with what each actually tells you. Alloy families and their selection follow. Failure mechanisms are covered in depth: ductile and brittle fracture, fatigue, creep and hydrogen effects, each with its fracture surface appearance. The course closes on failure investigation and on specifying material for a duty.

What you will learn

- Relate crystal structure and phases to mechanical behaviour
- Apply heat treatment to achieve a required property set
- Interpret tensile, hardness and impact test results
- Select alloys from the main families for a service condition
- Distinguish ductile, brittle, fatigue and creep failure
- Recognise hydrogen and environmental effects on materials
- Investigate a failure and specify material for a duty

Who should attend

- Mechanical and materials engineers
- Maintenance and reliability engineers
- Inspection and integrity staff
- Welding engineers and quality personnel
- Design engineers specifying components

Course outline

01 Evidence still present in the broken part
02 Crystal structure and phases
03 The iron carbon diagram
04 Heat treatment and resulting properties
05 Mechanical property testing
06 Alloy families and selection
07 Fracture, fatigue and creep
08 Hydrogen effects, failure investigation and specification

Upcoming dates

Dates	Venue	Format	Fee per delegate
19 to 23 October 2026	Online	Online	R8,500
2 to 6 November 2026	Cape Town, South Africa	Classroom	R19,950
21 to 25 December 2026	Gaborone, Botswana	Classroom	R19,950

Fees and how to register

This 5 day course is **R8,500** per delegate online, **R19,950** in the classroom in South Africa, Botswana, Namibia,

Lesotho and Eswatini, and **USD 1,325** in the classroom elsewhere in Africa. In-house training is quotation on request. Book 2 or more delegates on this course and save 10%.

To register or request an in-house proposal, visit **www.afrisciencegroup.com**, email **info@afriscience.co.za**, or WhatsApp us on **+27 63 479 1136**.

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