Training Courses for the High Value Engineering Industry

amrctraining.co.uk
The University of Sheffield AMRC Training Centre is recognised as the ‘Centre of Excellence’ for engineering training and development within the Sheffield City Region and beyond.

Our state-of-the-art facility offers a variety of continuous professional development (CPD) courses for you to consider, from Metals, Materials and Machining, to Leadership and Continuous Improvement.

The AMRC Training Centre has a strong, dynamic, focused team of industrialists continually driving the organisation forward. All of them have experienced the challenges of training world-class talent and developing specialist skills, enabling them to understand and respond to the requirements of the engineering and manufacturing sector.

We have industry leading facilities, the widest range of equipment, enthusiastic and experienced trainers, all supported by the best engineering companies in the UK.

For employers, we provide qualified employees with a tailored set of skills and hands-on experience with state-of-the-art machinery and technology. For young people, we provide the foundation for a rewarding career in some of the world’s most innovative industries.

To view our extensive calendar of training courses throughout the year and at many locations across the UK, please visit our website at www.amrctraining.co.uk/prospectus-courses

Find out more:
For further information please contact our Business Development Team:
T: 0114 222 4446
E: cpd@amrctraining.co.uk
Or visit our website at www.amrctraining.co.uk
Contents

4  Metals and Materials Courses
Short technical courses covering the processing and application of a range of materials, metals and alloys.

10  Metals Technology Certificate (METTECH)
A University of Sheffield Certificate of Achievement, demonstrating a comprehensive understanding of metals technology.

12  Metallurgy in the Nuclear Sector
A series of short courses explaining the roles and applications of steel and other alloys in all aspects of the defence and civil nuclear industries.

14  Machining
Short technical courses that combine classroom training with practical exercises on state-of-the-art machine tools.

16  ILM Level 3 Certificate in Leadership & Management
A programme of management training modules leading to an ILM level 3 qualification.

18  Apprenticeship Mentoring: Engineering the Next Generation
A course designed for apprentice mentors to understand, and help achieve, apprenticeship framework requirements.

19  Electrical
Industry recognised City & Guilds 17th Edition IEE Wiring Regulations (2382-15) qualification.

20  Quality and Standards
This new suite of courses introduces the principles and practices of quality control and quality assurance.

22  Continuous Improvement
A suite of training programmes giving manufacturing leaders the skills to drive improvement in business performance.

24  Apprenticeships
A variety of pathways for younger people wishing to embark on a career in high value engineering.

26  Higher Education
Our Higher Education pathway gives existing apprentices, employees or school and college leavers a different route to traditional university study.

ON DEMAND COURSES:
Many of our clients prefer to commission on demand courses at times and locations convenient to them, focussing on issues of specific relevance to their businesses.

Keep an eye out for the additional on demand courses highlighted at the end of each section.
Metals and Materials Courses

Short technical courses covering the processing and application of a range of materials, metals and alloys.

An understanding of the origins, intrinsic materials characteristics and processing parameters of metals is essential when selecting and specifying an alloy for a given application. Marketing and sales executives also benefit from a deeper understanding of the technical characteristics of their products.

These courses provide a working knowledge of the properties and applications of a range of ferrous and non-ferrous alloys.

Courses showing this symbol are available as part of the Metals Technology Certificate (METTECH).
See page 10.
Public Courses:

These courses are delivered at regular intervals in locations across the UK.

**Fundamentals of Metallurgy**

*Who should attend:* Staff who have a grounding in metals or materials science, who wish to extend their technical understanding.

*Course Aims:* To provide a basic understanding of the terminology and principles of all aspects of metals processing and applications.

*Duration:* One day (9.00am - 4.00pm)

*Fee:* £400 per person

**Metallurgy for Non-Metallurgists**

*Who should attend:* Professionals who work in the production, processing, specification, design, fabrication or selling of metals.

*Aims:* To provide a sound understanding of the scientific principles of metallurgy and how to apply them in an industrial context. Extends knowledge gained in the Fundamentals course.

*Duration:* Two days (9.00am - 4.00pm)

*Fee:* £700 per person

**Carbon and Alloy Steel Metallurgy**

*Who should attend:* Personnel in technical and engineering positions who require a full and detailed understanding of steel metallurgy.

*Aims:* To provide a comprehensive understanding of the metallurgy and processing of carbon and alloy steels.

*Duration:* One day (9.00am - 4.00pm)

*Fee:* £400 per person

**Non-Ferrous Alloys**

*Who should attend:* Industry professionals engaged in the supply, processing and applications of non-ferrous alloys.

*Aims:* To provide a full understanding of the characteristics of a range of commonly-used non-ferrous alloys, how they are produced and the industrial applications to which they are suited.

*Duration:* One day (9.00am - 4.00pm)

*Fee:* £400 per person

**Stainless Steel Metallurgy**

*Who should attend:* Personnel involved in the production, processing, fabricating, utilising and selling of stainless steels.

*Aims:* To increase understanding of the different grades of stainless steel, their processing, properties and uses.

*Duration:* One day (9.00am - 4.00pm)

*Fee:* £400 per person
Principles of Heat Treatment

Who should attend: Those that require an overall understanding of the principles and practicalities of heat treatment.
Aims: To explain the benefits of heat treatment to a range of ferrous and light metal alloys.
Duration: One day (9.00am - 4.00pm)
Fee: £400 per person

Combating Corrosion

Who should attend: Engineers and designers involved in the supply of metals where aqueous or gaseous corrosion is of concern.
Aims: To give a full understanding of the principles of metallic corrosion and prevention mechanisms for a variety of applications.
Duration: One day (9.00am - 4.00pm)
Fee: £400 per person

Metals Processing and Manufacturing Technologies

Who should attend: Anyone requiring an overall understanding of the processing and principle methods in the manufacture of semi-finished and finished products made from the major industrial metals including steel, aluminium, titanium and nickel alloys.
Aims: This course outlines the primary and secondary processing of the major industrial metals and the downstream processes used to engineer finished components.
Duration: One day (9.00am - 4.00pm)
Fee: £400 per person

Metallurgical Failure Analysis and Prevention

Who should attend: Typical attendees of the course include designers and engineers from the metals, manufacturing and related industries.
Aims: This practical workshop will enable delegates to determine how and why a metal component has failed or fractured during service and to identify means of detecting and preventing such failures in the future.
Duration: Two days (9.00am - 4.00pm)
Fee: £700 per person
**Metallography & Microscopy**

**Who should attend:** Operators and users of metallography, optical and scanning electron microscopy facilities in all industry sectors. Also of value to managerial, operational, quality and technical staff with an interest in the microstructural evolution of metals in industrial applications.

**Aims:** To provide a comprehensive overview of the principles and practical applications of optical and scanning electron microscopy in a wide range of applications.

**Duration:** One day (9.00am - 4.00pm)

**Fee:** £400 per person

**Testing Techniques**

**Who should attend:** Technical and engineering staff involved in the specification and quality control of metals for all applications.

**Aims:** To provide a working understanding of the test methods used to determine the commonly measured mechanical properties of metals and of non-destructive testing techniques.

**Duration:** One day (9.00am - 4.00pm)

**Fee:** £400 per person
ON DEMAND COURSES:
Delivered at times and locations convenient to businesses/delegates. Fees on application.

Introduction to Metals
Who should attend: Those with a limited formal technical background who work within the metals industry. Typical attendees include HR professionals, administrative, marketing, project support and finance staff.
Aims: The course aims to provide delegates with an understanding of what metals are, why they are so important, how they are processed and where they are used.
Duration: Half day (9.00am - 1.00pm)

Introduction to Steel Metallurgy
Who should attend: Staff requiring familiarity with steel processing, standards and applications. Typically sales professionals.
Aims: To explain the basics of ferrous metallurgy and how steels are produced, tested and specified.
Duration: One day (9.00am - 4.00pm)

Heat Treatment for Professionals
Who should attend: Metallurgists and engineers who either use, or provide, heat treatment services. Including operations, technical, design and quality control engineers.
Aims: To provide professional metallurgists and engineers with a full understanding of the principles and practices of heat treatment.
Duration: Two days (9.00am - 4.00pm)
Metals for Aerospace Applications

Who should attend: Professionals whose activities link wholly or in part with the aerospace supply chain but have little experience of aerospace metals.

Aims: To provide an introduction to the principle aerospace metals and their applications. It describes their properties, how they are tested, processed and deployed in aircraft structures.

Duration: One day (9.00am - 4.00pm)

Valve Metallurgy for Non-Metallurgists

Who should attend: Professionals who require a deeper understanding of the materials and technologies used for valve manufacture. Directors, marketing, sales, designers/specifiers, procurement and manufacturing managers.

Aims: This course will enable sales personnel to communicate more effectively on a technical level, design engineers to optimise material and process selection and production managers to minimise the costs of manufacturing valves of the highest quality.

Duration: One day (9.00am - 4.00pm)

Introduction to MIG and TIG Welding

Who should attend: Anyone wishing to gain an understanding of the aspects of the welding processes used in the manufacturing industry.

Aims: These courses will provide delegates with an understanding of the basic health and safety requirements in welding, equipment set up and selection. The courses also include explanations, demonstrations and practice of MIG and TIG welding.

Duration: Five days each course (9.00am - 4.00pm)

Casting Processes and Techniques

Who should attend: Shop floor operatives, technical or non-technical staff, management personnel, sales and marketing professionals and apprentices.

Aims: To understand casting processes and rapid prototyping methods and techniques.

Duration: One day (9.00am - 4.00pm)

Casting Design

Who should attend: Practising designers and simulation process or methods engineers looking to gain, or improve, their depth of knowledge in producing designs for castings.

Aims: Provides design engineers, production, specification and procurement professionals with an in-depth understanding of the opportunities and constraints of a variety of casting processes.

Duration: One day (9.00am - 4.00pm)

Introduction to Closed Die Forging

Who should attend: The course is particularly suitable for forge operators, tool designers and staff in supervisory positions.

Aims: To provide delegates with a sound understanding of basic, metallurgical principles of forging, principles of tool design and process control optimised quality and efficiency.

Duration: One day (9.00am - 4.00pm)
Metals Technology Certificate (METTECH)

METTECH is a coordinated programme of training courses intended primarily for technical staff who are routinely involved in the processing or testing of metals-based products. It is also suitable as technical background for staff in engineering and commercial functions.

Candidates are supplied with a self-study manual and must select six one-day modules from the course list below. Each is accompanied by a comprehensive set of notes (typically 100 pages) and is assessed by an online, multiple choice exam.
Course options –
Select any six from the courses below
- Fundamentals of Metallurgy
- Carbon and Alloy Steel Metallurgy
- Stainless Steel Metallurgy
- Non-Ferrous Alloys
- Metals Processing and Manufacturing Technologies
- Principles of Heat Treatment
- Quality and Quality Control
- Metallography and Microscopy
- Testing Techniques
- Metallurgical Failure Analysis and Prevention
- Nuclear Metallurgy for Non-Metallurgists
- Nuclear Materials

The course was good overall, I would definitely recommend it.”

Michael Whitworth, AAM Glasgow Manufacturing Facility.
Metallurgy in the Nuclear Sector

A suite of short courses developed at the request of Sellafield Ltd. and the National Nuclear Laboratory but available to all businesses and individuals involved in the defence and civil nuclear sectors.

Dates for the initial series of six one day courses have been scheduled in the ENERGUS training centre in Workington. Further dates and venues available on request.
Course contents

Each course will be delivered in one day from 09.00am to 16.00pm with breaks for coffee, lunch and tea. Catering is included in the fee.

Outline course contents are shown below. Please contact Graham Small for further information.

**Metallurgical Failure Analysis & Prevention**
- Fundamentals of metals strength and integrity
- Mechanical properties and failure mechanisms
- Corrosion failure mechanisms
- Failure analysis techniques
- Consequences of metal failure - case studies
- Preventative techniques

**Nuclear Metallurgy for Non-Metallurgists**
- Crystal structures and phase diagrams
- Mechanical testing and material standards
- Heat treatment of metals
- Forming processes
- Joining processes

**Nuclear Materials (Stainless Steel, Zr/Ti, Uo2)**
- Primary processing of steels, Zr and Ti alloys
- Key properties of steels, Zr and Ti alloys
- Steel Zr and Ti alloy specifications
- Nuclear applications of steels, Zr and Ti
- Manufacture of Uo2 fuel pellets
- Effects of irradiation

**Optical & Electron Microscopy for Nuclear Applications**
- Sample preparation
- Fundamentals of optical microscopy
- Bright field and dark field imaging
- Image analysis techniques
- Fundamentals of electron microscopy
- Applications in Post Irradiation Examination

**Combating Corrosion**
- Mechanisms and forms of corrosion
- Corrosion in nuclear applications
- Inspection and testing techniques
- Designing to prevent corrosion
- Corrosion prevention technologies

**Testing Techniques**
- Hardness testing
- Tensile testing
- Fracture toughness
- Creep
- Fatigue
- Non-destructive testing
Machining Courses

Short technical courses that combine classroom training with practical exercises on state-of-the-art machine tools.

The majority of engineered components require some form of machining operation during manufacture. Progression through the Introductory, Intermediate and Advanced courses will provide you with the knowledge and skills to undertake the most complex, multi-axis CNC challenges.
MACHINING COURSES:
Delivered on demand at times and locations convenient to businesses/delegates.

Introduction to CNC Milling
Who should attend: Operators, supervisors and managers with experience of manual milling who wish to upskill and expand their capabilities to include CNC.
Aims: A practical and theoretical introduction to the basic concepts of CNC milling and typical applications in today’s modern engineering environment.
Duration: Four days (9.00am - 4.00pm)
Fee: £500 per person

Intermediate CNC Milling
Who should attend: Operators, supervisors and managers with some experience of CNC milling who wish to upskill and expand their capabilities. Builds on the Introduction to CNC Milling course.
Aims: A practical and theoretical introduction to the basic concepts of CAD/CAM for 2½D CNC milling processes.
Duration: Four days (9.00am - 4.00pm)
Fee: £500 per person

Advanced CNC Milling
Who should attend: Operators, supervisors and managers with experience of CNC milling who wish to upskill and expand their capabilities to a high level. Builds on the Intermediate CNC Milling course.
Aims: An advanced course for CAM programming and production on CNC milling processes and applications.
Duration: Four days (9.00am - 4.00pm)
Fee: £500 per person

Introduction to CNC Turning
Who should attend: Operators, supervisors and managers with experience of manual turning who wish to upskill and expand their capabilities to include CNC.
Aims: An introduction to the basic concepts of CNC lathe-work and applications.
Duration: Four days (9.00am - 4.00pm)
Fee: £500 per person

Intermediate CNC Turning
Who should attend: Operators, supervisors and managers with some experience of CNC turning who wish to upskill and expand their capabilities. Builds on the Introduction to CNC Turning course.
Aims: A four day intermediate course giving a more in depth view of CNC lathe-work and applications.
Duration: Four days (9.00am - 4.00pm)
Fee: £500 per person

Advanced CNC Turning
Who should attend: Operators, supervisors and managers with experience of CNC turning who wish to upskill and expand their capabilities to a high level. Builds on the Intermediate CNC Turning course.
Aims: A four day advanced course for CAM programming and production on CNC turning centres.
Duration: Four days (9.00am - 4.00pm)
Fee: £500 per person
ILM Level 3 Certificate in Leadership & Management

A programme of management training modules leading to an ILM level 3 qualification.
The ILM Level 3 Certificate in Leadership & Management gives a broad understanding of leadership principles through eight modules, which include developing yourself, creating a high performing team, getting the best out of people and maximising materials.

We bring in guest speakers and there will be optional industry visits to showcase best practice. You can study on a part-time basis over a year to gain your level 3 qualification.

You will gain a range of management skills that you can put into practice in your own role. By building your own leadership capabilities you will be able to motivate and engage teams and manage relationships more confidently.

Course contents:

- Induction
- Module One Developing Yourself as a manufacturing leader
- Module Two Creating a high performing team
- Module Three Getting the best out of your people - maximising potential
- Module Four Problem solving - how to eat an elephant
- Module Five Production planning and allocating work
- Module Six Maximising materials and equipment
- Module Seven Safety is no accident
- Module Eight World class manufacturing

Fee: £995 per person

Additional modules can be included to enhance the overall diversity of the programme. Each unit would be a set fee. Please contact our business development team to discuss further.

“The trainer had 30 years’ experience, so excellent knowledge of content.”

Paul Churchill, Ansaldo NES.
Apprentice Mentoring: Engineering the Next Generation

A course designed for apprentice mentors to understand, and help achieve, apprenticeship framework requirements.

Employing apprentices is a useful way to grow your business and plan for the succession of staff. To maximise the potential, a structured training programme delivered by a good provider is critical. Additionally a structured, in-house, support system of mentoring is equally as essential.

This will ensure that your apprentices have every opportunity to be successful in your business and contribute to your bottom line as quickly as possible.

**Who should attend:** Individuals who have the responsibility for employing and training apprentices. For example, HR managers, operational managers, apprentice mentors, supervisors and team leaders.

**Aims:** To provide an understanding of what is included within the mentoring process for businesses employing apprentices. It will cover attributes required, the mentoring process and how to work with assessors.

**Duration:** One day (9.00am - 4.00pm)

**Fee:** £125 per person

Ensure that your apprentices have every opportunity to be successful in your business.
City & Guilds 17th Edition IEE Wiring Regulations (2382-15)

This industry recognised City & Guilds 17th Edition IEE Wiring Regulations (2382-15) qualification is aimed at both apprentices and established engineers who have electrical industry experience.

This workshop includes:
- Scope, object and fundamental principles
- Definitions
- Assessment and general characteristics
- Protection for safety
- Selection and erection of equipment
- Special installations or locations
- Inspection and testing

Duration: Four days (9.00am - 4.00pm)
Fee: £450 per person
Quality and Standards

This new suite of courses introduces the principles and practices of quality control and quality assurance.
Principles of Engineering Metrology

**Who should attend:** The course has been designed for design and manufacturing engineers, quality professionals and others engaged in a wide range of engineering applications.

**Aims:** This one day awareness course delivers an understanding of the importance of a variety of measurement and inspection techniques as applied in general engineering.

**Duration:** One day (9.00am - 4.00pm)

**Fee:** £400 per person

---

Introduction to ISO 14001: 2015

**Who should attend:** This course is suitable for individuals at all levels within businesses that are contemplating an application for ISO14001:2015 accreditation.

**Aims:** The course introduces the basic concepts of ISO standards and the principles and approaches of ISO14001:2015. The requirements of the standard are reviewed and the path to certification is explained.

**Duration:** One day (9.00am - 4.00pm)

**Fee:** £250 per person

---

Quality and Quality Control

**Who should attend:** Managerial and operational staff for whom quality systems are relevant. This extends to marketing, sales, design and manufacturing engineers in all industry sectors.

**Aims:** To provide delegates with a working knowledge of relevant tools and techniques so that they can be applied in the workplace.

**Duration:** One day (9.00am - 4.00pm)

**Fee:** £400 per person

---

Introduction to ISO 9001: 2015

**Who should attend:** This course is suitable for individuals at all levels within businesses that are contemplating an application for ISO9001:2015 accreditation.

**Aims:** The course introduces the basic concepts of ISO standards and the principles and approaches of ISO 9001:2015 (8 principles, risk based thinking, PDCA, process approach). The requirements of the standard are reviewed and the path to certification is explained.

**Duration:** One day (9.00am - 4.00pm)

**Fee:** £250 per person
Continuous Improvement

A suite of training programmes giving manufacturing leaders the skills required to drive improvements in business performance.
Continuous Improvement

Aims: The courses have been specifically designed to focus on the needs of the manufacturing sector. They provide a comprehensive level of training from Director level to plant floor operatives. Our goal is to ensure that the manufacturing sector in the UK is recognised as class leading and delivers the needs of the customer.

Who Should Attend: Board directors, senior managers, supervisors, functional leaders and front line employees. In summary the course programme has been developed to include everyone involved with your business.

Fees: On application for bespoke, in-house training delivery

Introduction to Lean Thinking (1/2 day)
- Increase understanding of Lean as a method of improvement
- Understand individual roles within the structure
- How non-value activities can be removed, thus saving money to re-invest in developing the business

Executive Introduction to Continuous Improvement (1/2 day)
- Course to introduce business leaders to the ‘bottom line’ impact of implementing a structured continuous improvement programme
- The value of leading change from the top

Continuous Improvement Yellow Belt (3 days)
- Gain the core practical skills to make real and long-lasting improvements
- Appreciate the importance of waste reduction and improving process flow

Continuous Improvement Green Belt (5 days)
- Build on existing skills to lead, manage and drive real changes using the DMAIC methodology
- Focus on the leadership skills needed to lead culture change and use the team to achieve results every time

Continuous Improvement Black Belt (10 days)
- Lead strategic transformation programmes and provide technical support to others in solving complex multi-functional problems
- Use enhanced statistical analytical tools to include design of experiments and ANOVA
- Identify alternative methods to identify opportunities
- Lead yourself and others in meeting the strategic aims of the organisation
- Manage fundamentals of finance within an organisation
Apprenticeships

A variety of pathways for younger people wishing to embark on a career in high value manufacturing.
An apprentice will provide your organisation with a cost-effective route to upskill your own talent. The AMRC Training Centre will support you and your apprentice throughout the entirety of their apprenticeship.

The 2016/17 academic year will see many changes to its education system. GCSE grades will move from grading letters such as A, B, C to a numerical system from 1 to 9.

The apprenticeship frameworks are also changing and new ‘trailblazer’ standards are being developed. You can be assured that the AMRC Training Centre is at the forefront of these changes and in fact, is significantly contributing to the development of these new standards.

Each of our pathways has over 60 modules to choose from, allowing you and your apprentice to specialise in a specific area. For example, they may follow a technical support pathway and specialise in design or metallurgy.

All of our pathways allow progression onto our Higher Education pathway.

**Entry requirements:** 5 GCSE Grade A*-C (including: Maths, English, Science) or 4 to 9 under the new education grade system effective from 2016/17.

**We offer five broad pathways for Advanced Apprenticeships:**

- Mechanical Manufacturing
- Fabrication and Welding
- Design and Quality Inspection
- Maintenance
- Electrical and Electronics
- Business Services

If you are an employer and would like to place an apprentice with us, please contact:

info@amrctraining.co.uk or call 0114 222 9958
Higher Education

Our Higher Education pathway gives existing apprentices, employees or school and college leavers a different route to traditional university study.
Higher Education

Our Higher Education pathway includes:

**Foundation Degrees**

Our Foundation Degrees are delivered using a blend of face to face learning - lectures, seminars and tutorials - with online and self-paced learning and support to enable the students to combine their studies with full time employment. The programme has been designed in partnership with academic staff and employers to ensure students can graduate equipped to meet the current and future needs of the advanced manufacturing sector.

We have three Foundation Degrees to choose from:

- **Mechanical Manufacture**
- **Manufacturing Technology**
- **Engineering Maintenance** NEW FOR 2017

**Top up degree in Mechanical Manufacture**

NEW FOR 2017

A 12 month programme to allow students graduating from the Foundation Degree in Mechanical Manufacture the opportunity to achieve a bachelor’s degree in engineering. The programme will include a project which students will apply to “a real world workplace scenario”.

**HNC in Engineering – Electrical or Mechanical**

The HNC focuses on progression in the world of higher level engineering. Two separate pathways are available:

- **Electrical**
- **Mechanical**

Both of these pathways follow a one day per week format over two academic years.

**Entry requirements for our Higher Education pathway are either:**

- BTEC Level 3 Extended / Diploma in Engineering (Advanced Apprenticeship) - overall grade MMM or higher.
  
  or

- A Levels, grade B or higher in Mathematics and Physics or Design Technology.

**If you are an employer interested in our Higher Education pathway, please contact:** info@amrctraining.co.uk or call 0114 222 9958
Training Courses are available at many locations across the UK, including:

ABERDEEN
AMRC TRAINING CENTRE, ROTHERHAM
WORKINGTON
WEST BROMWICH
BANBURY
LONDON

AMRC Training Centre, Advanced Manufacturing Park,
Off Highfield Spring, Catcliffe, Rotherham, S60 5BL

Find out more: For further information please contact our Business Development Team:
T: 0114 222 4446     E: cpd@amrctraining.co.uk     W: amrctraining.co.uk