5-DAY 3D PRINTING / ADDITIVE MANUFACTURING MASTER CLASS

4th to 8th December

Location - Dubai

What is 3D Printing or Additive Manufacturing?

3D Printing is an Additive Manufacturing technique that creates a physical object from a virtual 3D CAD model by depositing successive layers of material. They work like the traditional inkjet printers, but instead of ink, a 3D printer deposits desired material to manufacture an object from its digital format. 3D printing and rapid prototyping, in general, are widely claimed to have revolutionized not only the manufacturing industry but also many other walks of life like medicine, aerospace and automotive industry. This program on 3D Printing helps the participants understand the design, functioning and operation of a 3D Printer.

Course Summary:

The goal of this course is to present a comprehensive overview of AM, spanning from fundamentals to applications and technology trends, and with strong focus on high-performance materials. Participants will learn the fundamentals of AM of polymers, metals, composites, and biomaterials, and will realize how process capabilities (rate, cost, quality) are determined by the material characteristics, process parameters, and machine designs. Application areas including aerospace components, electronics, medical devices, and consumer products will be discussed via detailed examples and case studies. Particular emphasis will be placed on metal- and powder-based AM technologies, and related design principles and process standards to achieve high-performance materials and novel properties via AM. Lab sessions will provide hands-on experience with a variety of state-of-the-art AM equipment. Participants will design, fabricate, and measure test parts, and will perform experiments to explore process limits. The course will conclude with discussion of how AM will influence existing business models in design and manufacturing, will pose major opportunities and needs for advancement

Participant Takeaways:

- Learn the fundamentals of additive manufacturing (AM) of polymers, metals, and ceramics, along with those for emerging materials (e.g., nanocomposites, biomaterials) and complex architectures.
- Understand the operating principles, capabilities, and limitations of state-of-the-art AM methods, including laser melting, fused deposition modeling, stereo lithography, and jetting.
- Understand the principles of "Design for Additive Manufacturing" and compare and contrast additive processes with conventional manufacturing methods such as machining and molding in terms of rate, quality, cost, and flexibility.
- Gain hands-on experience with a variety of AM machines; use these machines to fabricate example parts, post-process the parts, and study the results.
- Become familiar with the complete workflow of AM, including computational design tools, file formats, toolpath generation, scanning, and microstructure characterization.
- Study applications of AM across industries, including aerospace/automotive, medical devices, energy, electronics, and consumer products.
- Place AM in the context of the evolving manufacturing infrastructure, including advances in robotics, software, logistics, and digitization of data.

Who Should Attend?

This course will be useful to design engineers, manufacturing engineers, product designers, research engineers, research scientists, and managers, VPs of product development and manufacturing, and technology and innovation strategists, from industries such as aerospace, automotive, medical devices, electronics, consumer products, energy, and robotics. The course material is accessible for those new to AM, yet highly comprehensive and valuable for those who already have significant experience with AM.

Delivery Method

Classroom based training with both conceptual and hands-on lab sessions. Understand how to quantitatively assess the suitability of AM for an application, and realize how this justification will change as AM improves.

Computer Requirements

Laptops or tablets are encouraged for this course

PROGRAM OUTLINE

DAY 1

- Introduction to additive manufacturing (AM)
- AM technology and market landscape
- Emerging trends and business models
- Participant introductions; discussion of course schedule
- Hands-on lab: Anatomy of AM machines
- Design case study part I
- AM parts to conventional processes

DAY 2

- Extrusion AM processes (polymers and composites)
- Photo-polymerization AM processes (polymers and ceramics)
- Jetting and lamination AM processes
- Hands-on lab: Fused deposition modeling (FDM) and stereolithography (SLA)
- Mechanics of polymer AM parts
- Design case study part II

DAY 3

- AM of metals: Selective laser melting, e-beam melting, direct powder deposition
- Qualification of AM parts, with focus on metals
- Hands-on lab: selective laser melting
- Hands-on lab: 3D scanning
- Geometry and property optimization

DAY 4

- Cost and business case analysis for AM
- Industry focus: Aerospace components, medical mplants, tooling, and consumer goods
- Continued discussion of industry applications and needs
- Integration of AM and electronics
- AM of biomaterials and tissues
- Design case study part III

DAY 5

- Group case-study presentations
- Future trends and implications of additive manufacturing: logistics, mass-customization, and emerging business models.
- Continued discussion and wrap-up

MELTON MOWBRAY®

CONTACT US

Melton Mowbray Limited
Kemp House, 152-160 City Road,
London EC1V 2NX United Kingdom

CALL
+44 20 3807 4436

Max Lawson
max@melbray.co.uk