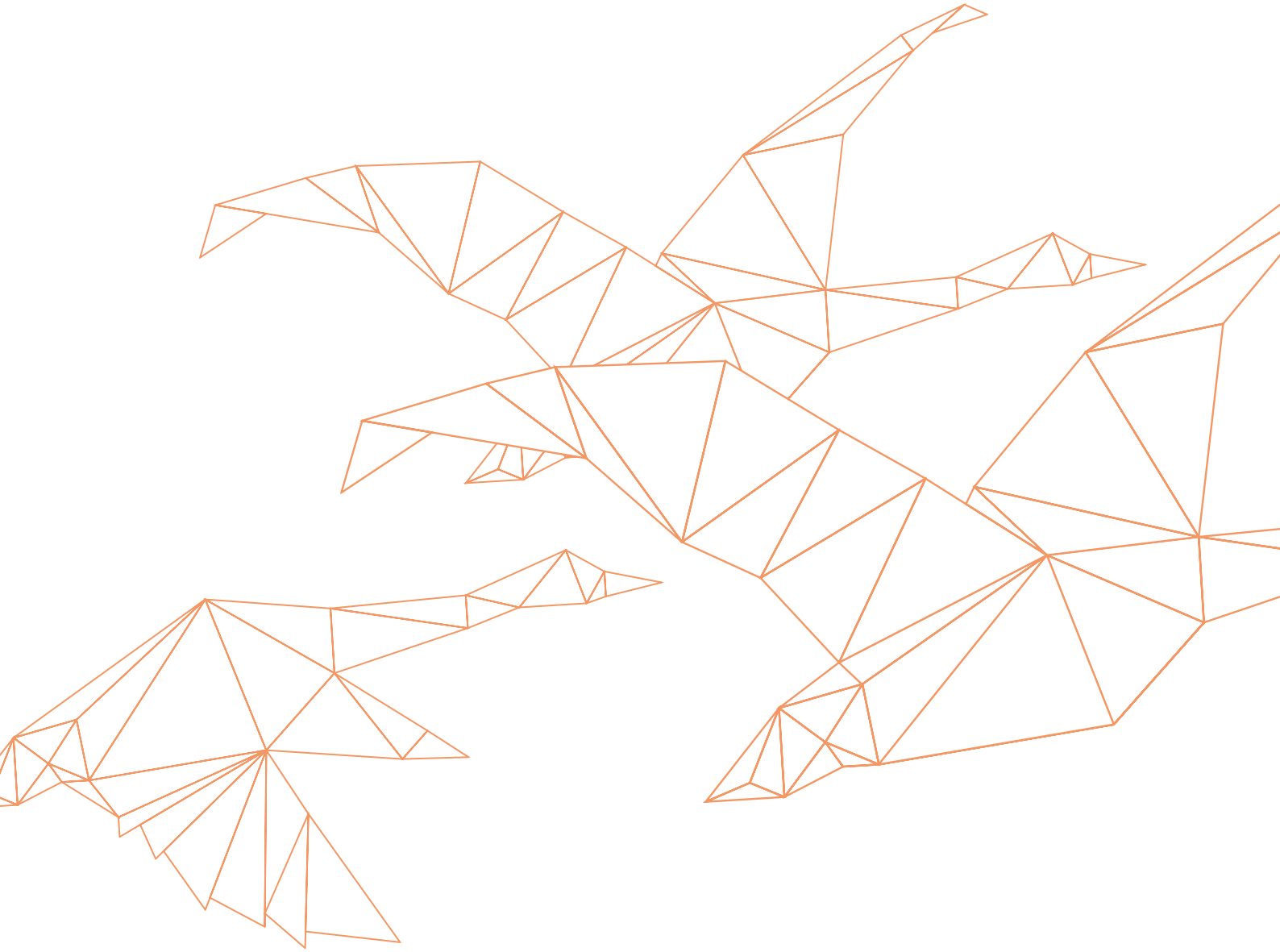
ADDITIVEMINDS
EXCELLENCE IN INDUSTRIAL 3D PRINTING



Academy
Training & Workshop Catalog

e-Manufacturing Solutions

Get started

→ Innovation with 3D printing
→ Design for additive manufacturing
→ Topology optimization

Academy Training & Workshop Catalog

Scale

Ramp-up

- → Application Engineer expert program
- → Lattice structure training
- → Parameter Editor training
- → EOSTATE MeltPool monitoring training

- → Train the trainer
- → Scaling sustainable know-how within your organization

See our consulting portfolio for further information.

Your Key Benefits

- → Learn from the market leader in additive manufacturing (AM) systems and consulting
- → Get tangible results within a few days, agile and hands-on
- → Choose from a variety of levels: beginners, advanced and expert courses
- → Hands-on and "edutainment" trainings, learn fast and have fun

Training & Workshop Portfolio

Contact us
to get your quote:

amc@eos.info
www.additive-minds.com

Innovation with 3D Printing

Your fast track to understand additive manufacturing (AM), its possibilities and limitations.

Objectives

- → Identify and understand the key benefits of AM
- → Become the AM thought leader within your company and inspire others
- → Discover how to optimize for the AM production process by learning from best-in-class business cases
- → Unleash your creativity and find innovative AM applications
- → Analyze your value chain and see how AM can positively influence it
- → Know how to screen and select parts from your portfolio

Information

Duration:	1–3 days
Training level:	beginners and advanced
Seminar size:	maximum of 10 participants
Venue:	at EOS HQ or at your site
Dates:	on request
Times:	9 a.m. to 5 p.m.
Package price:	EUR 1,920 per day (excl. travel costs)

Content

Module 1
Introduction to additive manufacturing

- → Experiencing 3D printing
- → Getting to know the different materials, systems and technologies

Module 2
Development & production with AM

- → Freedom of design and production
- → Understanding the advantages and potentials of AM
- → Discussing case examples taken from industry

Module 3
Analyzing the value chain

- → The impact of AM on the participants' industries, companies and competitors

Module 4
Fundamentals of the production process

- → Detailed consideration of the process chain in AM
- → How technology works

Module 5
Design for additive manufacturing

- → Introduction to the design rules for AM
- → Design Thinking method

Module 6
Component selection

- → Introduction to the methodology of component selection
- → Unit cost calculation
- → Assessing the potential
- → Technology trends and developments

Module 7
Technological implementation roadmap

- → Production planning from the idea through to manufacturing
- → Organization and team set-up
- → Employee training
- → Change management
- → Technology development

Design for Additive Manufacturing

Learn how to design for additive manufacturing (AM) in a hands-on workshop for metal or polymer.

Objectives

- → Knowing the possibilities and limitations of AM
- → Learn how to successfully design, optimize, build and apply AM
- → Discover the AM Design Thinking methodology
- → Experience AM process chain with a hands-on approach
- → Understanding the design workflow
- → Learn technical and design guidelines
- → Learn innovative designs like bionics and lightweight
- → Using AM design on practical exercises

Content

Module 1
Possibilities and limitations of AM
- → Functional integration
- → Mass customization
- → Complexity for free

Module 2
Workflow
- → Design and data processing
- → Job preparation and building
- → Post-processing

Module 3
Material, system and process fundamentals
- → Material properties
- → System set-up
- → Thermal process
- → Layer building
- → Shrinkage and distortion
- → Laser and powder interaction

Module 4
Design guidelines
- → Wall thicknesses
- → Gap dimensions
- → Removability of powder

Module 5
Mindset AM design
- → Methodology
- → Way of thinking
- → Case examples

Module 6
Hands-on experience
- → Data processing
- → System operation
- → Post-processing

Module 7
Part optimization
- → Parts and job analysis
- → Redesign potentials though bionic and topology optimization

Module 8
Best practices and insights into the application
- → Optimized data handling
- → Part quality
- → Cost reduction by design

Information

Duration:	3 days
Training level:	beginners and advanced
Seminar size:	maximum of 8 participants
Venue:	at EOS HQ
Dates:	on request
Times:	9 a.m. to 5 p.m.
Package price:	EUR 1,920 per day (excl. travel costs)

Topology Optimization

Learn how to design combining topology optimization for additive manufacturing (AM) in a hands-on workshop.

Objectives

- → Knowing the possibilities and limitations of AM
- → Learn innovative design approaches and processes applicable to AM technology
- → Learn how to apply simulation technology in order to design lightweight structures
- → Learn the background and theory of design optimization
- → Understand the design workflow
- → Learn and apply organic design approaches to produce bionic like structures
- → Learn technical and design guidelines
- → Using AM design on practical exercises

Information

Duration:	2 days
Training level:	advanced
Seminar size:	maximum of 8 participants
Venue:	at EOS HQ
Dates:	on request
Times:	9 a.m. to 5 p.m.
Package price:	EUR 1,490 per person (excl. travel costs)

Content

Module 1
Awareness session

- → Design challenges and opportunities for AM
- → Optimization-driven design and use cases

Module 2
Introduction to stress analysis

- → Theoretical background
- → Setting up a linear static stress analysis and practical exercises

Module 3
Introduction to optimization

- → Theoretical background of computational optimization
- → Optimization types
- → Application of topology

Module 4
Topology optimization for AM 1/2

- → Common strategies
- → Generation of concepts
- → Practical exercises

Module 5
Topology optimization for AM 2/2

- → Evaluation of concepts
- → Orientation definition and manufacturing process design

Module 6
Introduction to topology re-engineering

- → Organic design
- → Approach to organic design
- → Software
- → Practical exercises optimization
- → Practical exercises

Module 7
Practical session for organic design

- → Apply concepts learned regarding organic design approaches

Module 8
Open lab and conclusion

- → Open discussion
- → Q/A session

Application Engineer

Developing additive manufacturing experts.

Objectives

- → Gain a competitive advantage by developing best-of-class AM engineers
- → Rapid know-how development by leading industry experts
- → Unlock the full potential of your employees in just six months
- → Save time and money compared to conventional trial-and-error learning

Content

Module 1
Introduction to AM & getting started with application engineering tools

- → AM technology and process overview
- → Orientation and support generation
- → DMLS laser parameters
- → Basic AM design rules

Module 2
Develop innovative AM applications

- → Build failure analysis, part evaluation, AM application sprint
- → Possibilities and challenges of AM

Module 3
Hidden interdependencies of the AM triangle

- → Parameter editor
- → Mechanical testing of AM specimens
- → Residual build stress, support characteristics
- → Advanced AM design

Module 4
Quality

- → Part size verification
- → Heat treatment
- → NDT and density evaluation, advanced postprocessing
- → Establishing quality

Module 5
Limits of process, material & system

- → Material characteristics/ metallurgy
- → How to approach new materials

Module 6
New materials for AM

- → Material development methodology
- → Master cases

Module 7
Implement your AM transformation

- → Preparing, implementing and consolidating change

Information

Duration:	6 months
Training level:	beginners and advanced
Seminar size:	maximum of 8 participants
Venue:	at EOS HQ, University of Wolverhampton, SRH Berlin
Dates:	on request
Times:	9 a.m. to 5 p.m.
Package price:	EUR 47,250 per person (excl. travel costs)

Parameter Editing

Unleash the full potential of additive manufacturing by tailoring and customizing exposure strategies to make great products even better.

Objectives

→ Enabling use of the parameter editor and understanding the cause and effects of parameter modifications

→ Helping to develop individual problem-solving strategies for challenging objects

→ Teaching a basic understanding of principles to develop exposure strategies for new materials

→ Using parameter editor functionalities to improve surface finish, part density, productivity, etc.

Content

Module 1

Getting started with parameter editing

→ Enabling use of parameter editing functionalities, optimized to customer's application goals (surface roughness/strength of material/stress management/...)

Module 2

Overcoming challenging objects with parameter editing

→ Helping customers to help themselves by utilizing parameter editing functionalities to develop individual problem-solving strategies for challenging objects

Module 3

Exposure strategies for new materials

→ Basic understanding of principles to develop exposure strategies for new materials

Information

Duration:	2–5 days
Training level:	high-expertise in building jobs, EOS metal systems installed, Exposure Editor Training completed
Seminar size:	maximum of 4 participants
Venue:	at EOS HQ or at your site
Dates:	on request
Times:	9 a.m. to 5 p.m.
Package price:	EUR 1,920 per day (excl. travel costs)

Lattice Structure Design

Using lattice structures to generate the next generation of medical implants, bionic-inspired lightweight components, etc.

Objectives

→ Analyzing the customer's application goal
→ Definition of the optimization potentials
→ Selection of critical parameters for test scope
→ Definition of "test scope" based on several iterations and execution of test
→ Documentation of results and follow-up

Content

Module 1
Possibilities and limitations of lattice structures

→ Lattice design
→ Cleaning methods
→ Software packages

Module 2
Analysis of customer's application goal

→ Understand specific needs
→ Highlight limitations of standard parameters

Module 3
Highlight lattice exposure strategies

→ Parameter modification cause and effect
→ Limitations and optimization opportunities
→ Manufacturability
→ Laser-driven design

Module 4
Definition of optimization potential related to selected application levers

→ Build rate
→ Mechanical properties
→ Surface roughness

Module 5
Selection of critical parameters for test scope

→ Lattice design
→ Exposure strategies
→ Cleanability
→ Mechanical properties
→ Manufacturability

Module 6
Definition of "test scope" based on several iterations and execution of test

→ Lattice porosity
→ Lattice roughness
→ Manufacturability
→ Mechanical properties

Information

Duration:	2–4 days
Training level:	advanced, EOS metal system installed, Exposure Editor Training completed
Seminar size:	maximum of 5 participants
Venue:	at EOS HQ or at your site
Dates:	on request
Times:	9 a.m. to 5 p.m.
Package price:	EUR 1,920 per day (excl. travel costs)

EOSTATE MeltPool Monitoring

Implement EOSTATE MeltPool monitoring in your quality assurance chain to generate true value-add.

Objectives

→ Knowing what EOSTATE MeltPool monitoring is and how it works

→ Introduction to the physics of the MeltPool, signal theory and algorithms

→ Understanding the complexity of correlations between part quality, process and MeltPool data

→ Awareness of evaluation job geometries, design of experiments and possible pitfalls

→ Strengthening basic knowledge of about analysis and correlation. Know-how, including destructive and non-destructive test methods

Content

Module 1

First steps

→ Software set-up and calibration

→ Introduction to EOSTATE MeltPool online software

Module 2

Analysis Toolbox

Expert Training day 1

→ Introduction, revision

→ Algorithms, theory

→ First steps

→ General parameters and settings

Module 3

Analysis Toolbox

Expert Training day 2

→ Visualizations

→ Analysis parameters

→ Indications

→ 3D visualization

→ Extra features

Information

Duration:	2–3 days
Training level:	advanced, EOS metal system installed, Exposure Editor Training completed
Seminar size:	maximum of 4 participants
Venue:	at EOS HQ or at your site
Dates:	on request
Times:	9 a.m. to 5 p.m.
Package price:	EUR 1,920 per day (excl. travel costs)

EOSTATE Exposure OT

Implement optical tomography in your quality assurance chain to generate true added value.

Objectives

- → Knowing what EOSTATE Exposure OT is and how it works
- → Introduction to the physics of the process, detection mechanisms and analysis methods
- → Holistic understanding of usage of the OT client
- → Awareness of evaluation job geometries, design of experiments and possible pitfalls
- → Strengthening basic knowledge of analysis and correlation. Know-how, including introduction to common destructive and non-destructive test methods

Content

Module 1

First steps

- → Software set-up and calibration
- → Introduction to EOSTATE Exposure OT

Module 2

Analysis Toolbox

Expert Training day 1

- → Introduction, revision
- → Process basics, measurement set-up
- → Algorithms
- → First steps

Module 3

Analysis Toolbox

Expert Training day 2

- → Visualizations
- → Analysis parameters
- → Indications
- → 3D visualization
- → Extra features

Information

Duration:	2–3 days
Training level:	advanced, EOS metal system installed, Exposure Editor Training completed
Seminar size:	maximum of 4 participants
Venue:	at EOS HQ or at your site
Dates:	on request
Times:	9 a.m. to 5 p.m.
Package price:	EUR 1,920 per day (excl. travel costs)

New Business Models with AM

Additive manufacturing (AM) is turning our knowledge about the feasibility of products completely upside down. The technology is currently on its way from a paradigm shift to mass production.

Objectives

- → Knowing the possibilities and limitations of AM
- → Learn about the boundless possibilities of product variations
- → Helping to reinvent your production and supply chain processes
- → Demonstrating how to acquire shorter cycles regarding market launch
- → Learn how to develop decentralized and flexible production as a basis of Industry 4.0

Content

Module 1
Introduction to AM

- → Technology fundamentals
- → Advantages and disadvantages versus conventional production
- → Best practice cases

Module 2
Think different

- → Understand customers
- → Voice of the customer
- → Critical to quality
- → Basics in Design Thinking

Module 3
Business model development

- → Defragmentation of existing business models
- → Blue ocean strategy
- → Business canvas
- → Lean start-up

Module 4
Supply chain

- → Complexity reduction
- → Inventory reductions
- → Flexibilization
- → Throughput to market launch
- → Dezentralization
- → Agile management

Module 5
Production

- → Value engineering
- → Product development processes
- → Maintenance
- → Industry 4.0
- → Quality assurance

Information

Duration:	2 days
Training level:	advanced, EOS systems installed, (small) series production
Seminar size:	maximum of 8 participants
Venue:	Munich
Dates:	on request
Times:	9 a.m. to 6 p.m.
Package price:	EUR 1,700 per participant (excl. travel costs)

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