PROTIQ
A Phoenix Contact Company

Our training courses

Become a 3D-printing professional

Companies nowadays are integrating industrial 3D printing into their manufacturing processes with increasing frequency and benefiting from individual, fast component production. Additive processes are therefore extending the process chain of conventional manufacturing methods to include additional potential that can be used, for example, to make original molds and prototypes. But many companies are not yet sure how they can exploit the considerable opportunities of additive technologies for themselves. Gain an initial insight into the world of 3D printing with the basic module or familiarize yourself with the individual production stages in practice-based workshops – from design to finishing of the end product. Our training courses can be combined as you wish and are designed to suit your current knowledge level and learning objectives.

Let us draw up an individualized training program for you.

We'd be glad to advise you!

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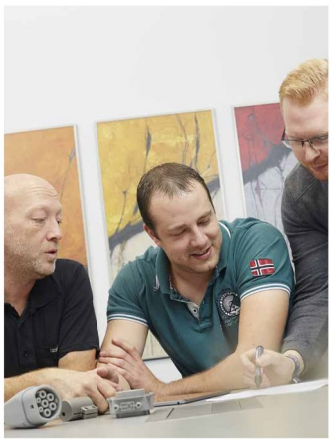
Basic module

Basics of additive manufacturing

In the "Basics of additive manufacturing" training module, you will discover how 3D printing has become an innovation driver for industry. Familiarize yourself with the standard terminology and the advantages of the various additive manufacturing processes. Using specific application examples, we examine how companies are benefiting from the extraordinary design freedom provided by a technology which also allows cost-effective production of customized (small) series.

Course content:

- Historical development
- Terminology
- Process chain
- Additive manufacturing process
- Product development
- Work safety and periphery
- Application examples
- Data preparation



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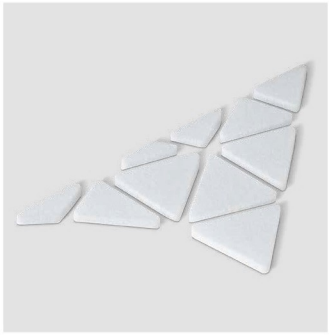
Process modules

Selective laser sintering (SLS)/ MultiJet Fusion (MJF)

Selective laser sintering and the MultiJet Fusion process make it possible to create precision 3D objects made of resilient plastic. In the corresponding training module, we will teach you the principles behind the technologies, some important design guidelines and the characteristics of the materials used.

Course content:

- Basics (principle of the process, machines, the process chain)
- SLS/MJF plastics
- Data preparation and construction job layout
- Construction process (laser, powder application, lighting, post-process)



Selective laser melting (SLM)

Selective lasersintering processes metallic materials. In addition to the principles of the process, this module examines the distinctive features of 3D printing with metal, including material and component characteristics and fault-free process management.

Course content:

- Basics (principle of the process, machines, the process chain)
- SLM metals
- Data preparation and construction job layout
- Construction process (laser, powder application, lighting, post-process)

Stereolithography (SLA)/ PolyJet Modeling (PJM)

In stereolithography and PolyJet Modeling, delicate 3D objects can be created from liquid photopolymers (plastic), including original molds for various casting processes. Our course informs you about the various manufacturing processes, material and component characteristics and the machines used.

Course content:

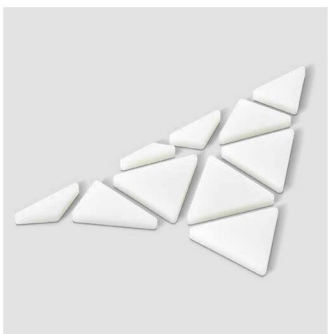
- Overview of the processes
- SLA/PJM plastics
- Machine
- Areas of application (vacuum casting/ printed injection molding inserts)

Alternative processes

For industrial applications, the powder processes of laser melting and laser sintering, in particular, have become established. In addition, there are now many other additive manufacturing technologies. In the “Alternative processes” training module, we will teach you how to make impressive 3D objects from materials such as paper, plastic film and ceramics. We will also tell you about the latest developments and current trends in alternative technologies.

Course content:

- Fused Deposition Modeling (FDM)/Fused Layer Modeling (FLM)
- 3D printing with plaster powder (3DP)
- Laminated Object Modeling (LOM)
- Multi-stage processes, e.g.: Lithogra phy-Based Ceramic Manufacturing (LCM), BASF Metal Filaments
- New developments/ current trends



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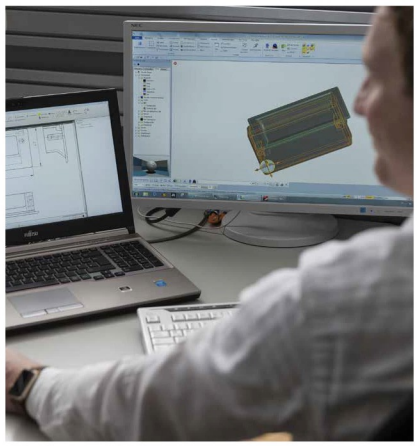
Extension modules

Construction

In the development phase of 3D models, it is essential to follow certain design guidelines to exclude defects in the finished object from the outset. Whether it's staircase effects or cross-sectional cracks – we explain tricky areas of the workpiece to you and give you design tips so that you can ensure the quality of your final components even at the development phase.

Course content:

- Construction guidelines
- Paradigm shift toward additive manufacturing
- Exceed the confines of conventional manufacturing
- Functional integration

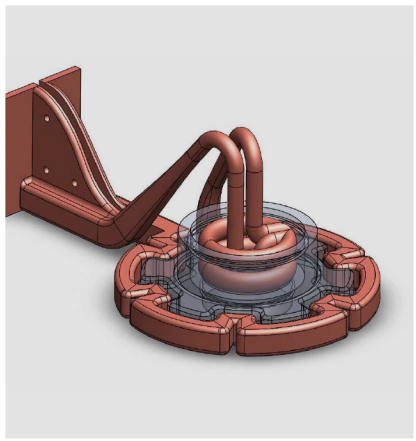


Computer-supported production optimization

The development of the optimal basic mold contributes significantly to maximizing the effectiveness of dies and die inserts, for example. We show you how you can determine the ideal geometry of a component even in the early phases of product development with the aid of data-based simulations, without wasting valuable time on inefficient "trial-and-error" grinding.

Course content:

- Power flow-oriented construction through topology optimization
- Optimal performance through magnetical field optimisation in inductors
- Lightweight
- Design verification

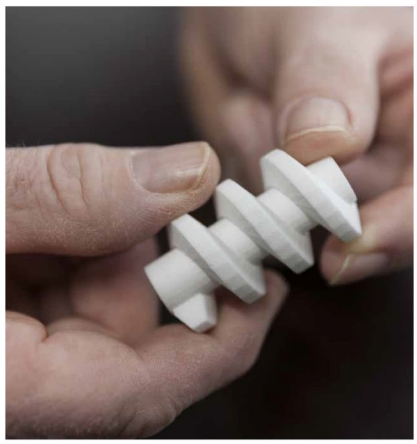


Quality management in additive manufacturing

Quality management systems set out customer-satisfaction, cost-reduction and quality-enhancement standards for products and services. As a company certified to DQS ISO 9001 and IQNET IS 9001, we will explain to you how industrial 3D printing processes meet these requirements.

Course content:

- Stipulations on quality management systems
- Safety aspects and safety measures
- Definition of measuring points
- Quality monitoring and error prevention



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Workshops

Component selection / Component redesign / AM-appropriate design

In our one-day practical workshop, we show you how to identify workpieces that can be produced more cost-effectively and can be improved by additive manufacturing processes if necessary. We use objects from your own production as examples for analysis so that you can use the insights you gain for your own direct benefit. You will also find out how to adapt the design of your 3D models to the corresponding 3D printing process to ensure problem-free manufacturing of your components.

Course content:

- Potential analysis of product portfolio
- Evaluation of optimisation potential for 3D printing
- Economic efficiency analysis

Hands-on user training

In the hands-on user training course, you'll get to know the entire process chain of additive manufacturing using concrete examples taken from actual practice. Starting with the potential analysis, via AM-appropriate design, through to production and subsequent finishing, you will experience industrial 3D printing close up. Through training that is very close to reality, you will learn to understand the distinctive features of the various processes and to make use of additive manufacturing in a cost-effective way.

Course content:

- Component preparation
- Construction job creation
- Machine operation
- Component post processing

Group training

1. Training day: The basic module and the process modules teach you the basics of additive manufacturing processes.
2. Training day: The expansion modules delve even further into the subject areas.
3. Training day: Workshops provide you with practical insights.

Still have questions?
We'll be more than happy to advise you on our range of training options.

Contact us now:

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