



## Examples\* for courses on the DRAGON platform offered in the areas

- Production Management
- Production Engineering
- Quality Management
- Project Management

\*The courses listed on the following slides serve as examples and usually are adapted to individual companies' needs, discussed in direct contact with the providers. All courses are available in English language and most courses are available in Chinese language. Some courses are free of charge and some courses need to be booked for a fee according to efforts for adaptation.



## Project Training Partners as course providers

- **Global Advanced Manufacturing Institute (GAMI)** in cooperation with wbk Institute of Production Science at the Karlsruher Institute of Technology (KIT)
- **Winkler Bildungszentrum GmbH (WBZ)**

In addition some courses were created by the **Scientific and Technical Partners** during the term of the project:

- **Competence Center Automation Düsseldorf (CCAD)**
- **Fraunhofer Institute for Industrial Engineering (Fh-IAO)**
- **vitero GmbH**

*For getting more information or booking a course please send an E-Mail to:  
[dragon@fraunhofer.iao.de](mailto:dragon@fraunhofer.iao.de)*

# Overview

Area	Course level	Name of the course
Production Management	Basic	<ul style="list-style-type: none"><li>• Lean Line Design Preview*</li></ul>
	Advanced	<ul style="list-style-type: none"><li>• Lean Line Design</li><li>• Lean Production*</li></ul>
Production Engineering	Basic	<ul style="list-style-type: none"><li>• Operating &amp; Monitoring</li><li>• PROFINET on Phoenix Contact platform</li><li>• Quiz App for Production Engineering*</li><li>• Remote Training of PROFINET*</li><li>• PROFINET Remote Lab*</li></ul>
	Advanced	<ul style="list-style-type: none"><li>• Industry 4.0 training in Automation Engineering</li><li>• AUTOMATION live training</li><li>• Digital media for training of complex technical systems</li><li>• PROFINET in Industrial Applications</li><li>• Quiz App for Production Engineering*</li></ul>

\*The courses are Open courses.

# Overview

Area	Course level	Name of the course
Quality Management	Basic	<ul style="list-style-type: none"><li>• 8D Report</li><li>• Basics of Poka-Yoke</li><li>• 7 Quality Tools</li><li>• Quality Management Introduction</li></ul>
	Advanced	<ul style="list-style-type: none"><li>• Systematic approach to failure prevention – Poka-Yoke</li><li>• Six Sigma Green Belt</li><li>• Production Part Approval Process &amp; Advanced Product Quality Planning (PPAP and APQP)</li><li>• Failure Mode and Effects Analysis (FMEA) *</li></ul>
Project Engineering	Basic	<ul style="list-style-type: none"><li>• Training Within Industry</li><li>• Improving workflow and efficiency in teams</li><li>• Using web conferencing for synchronized learning</li></ul>
	Advanced	<ul style="list-style-type: none"><li>• 7 steps to effective problem solving for a high performance team</li></ul>

\*The courses are Open courses.

# Production Management (1)

Name of the course	Description
<b>Lean Production</b>	Lean production is rooted in the production law, is the production of the law constantly sum up and develop on the basis of the formation of the enterprise operating system solutions, allowing enterprises to continue to maintain vitality and competitiveness, to achieve sustainable development. In the practice of lean production, because of its error or one-sided understanding, resulting in the implementation is not in place, did not produce its due value, and even hurt the fundamental business. The training on the basis of scientific knowledge of lean production, in the mode of thinking and practice to inspire students, so that the correct understanding of lean, and master the practice of lean mode, to achieve the enterprise lean conversion and personal self-improvement and breakthrough. The training will also showcase some of the practical applications of lean production in the Industrial 4.0 automation assembly line.

This course is part of a wide range of technical courses offered by **GAMI**. It is **costfree** and can be run by registering to the DRAGON Moodle platform:

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# Production Management (2)

Name of the course	Description
<b>Lean Line Design Preview</b>	Lean production line design is one of the best systematic approach to streamline processes and eliminate waste. The aim is to redesign production and logistics in order to improve overall efficiency and flexibility, as well as reduce the proportion of investment, the required space and shorten the output time. In lean production line design, tool design tools and visual factory tools and optimized material distribution are key elements. At the same time, intelligent tools will be introduced, which can automatically collect data, and further analysis and provide countermeasures.

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# Production Management (3)

Name of the course	Description
<b>Lean Line Design</b>	Lean production line design is one of the best systematic approach to streamline processes and eliminate waste. The aim is to redesign production and logistics in order to improve overall efficiency and flexibility, as well as reduce the proportion of investment, the required space and shorten the output time. In lean production line design, tool design tools and visual factory tools and optimized material distribution are key elements. At the same time, intelligent tools will be introduced, which can automatically collect data, and further analysis and provide countermeasures.

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# Production Engineering (1)

Name of the course	Description
<b>GAMI_Lean Production enabled by Industry 4.0</b>	Lean Production is embedded in corporate fundamental principles. It is a systematical operational solution emerged from continuously refined and developed production laws. It will maintain vitality and competitiveness for the company, thus to realize sustainable business. In the practice of Lean Production, one-sided or incorrect understanding will often lead to bad execution or low performance, even it could damage the fundamental of the company. In this course, participants will be inspired above scientific Lean Production theory by the right mind setting and practice orientation, to really achieve corporate lean transformation as well as self-development and breakthrough. Some practical applications of Lean Production will be shown in the automated assembly line enabled by Industry 4.0.

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# Production Engineering (2)

Name of the course	Description
<b>Remote Training of PROFINET</b>	<p>PROFINET Remote Lab is a multi-functional education and training system for the realtime Ethernet communication system PROFINET based on sophisticated web technologies.</p> <p>The learning environment will supply the student with both offline and online lessons including remote lab units. Thus a student can first learn about the basics of PROFINET technology. Afterwards he might connect to an experimental assembly station for a live session.</p>
<b>Remote Training of PLC programming</b>	<p>Introduction in the PLC programming according the standard IEC 61131. The programming task in the lab can be tested remotely by the Internet on an EduNet Starter Kit of Phoenix Contact (PLC controller).</p>

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# Production Engineering (3)

Name of the course	Description
<b>Operating &amp; Monitoring</b>	<p>The course objective is the development and test of a web-based dynamic interactive HMI (Human Machine Interface) for operating &amp; monitoring of an assembly station for model cars in the Duesseldorf Telelaboratory.</p> <p>The course consist of three parts:</p> <ol style="list-style-type: none"><li>1. Initial training in the projecting methode of a HMI by the IIoT platform WOAS. Projecting of a simple HMI.</li><li>2. Development and test of a simple SVG process animation for operating &amp; monitoring of a simulated press machine.</li><li>3. Development and test of a HMI for measurement of the time delay for the gripper arm in Station 2 of the assembly station in the Düsseldorf Telelaboratory</li></ol>

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# Production Engineering (4)

Name of the course	Description
<b>Industry 4.0 training in Automation Engineering</b>	<p>The course deals with an introduction in Industry 4.0 for Automation Engineering. The individual course plan is depending from the experiences &amp; knowledge of the participants.</p> <p>Content of the course:</p> <ul style="list-style-type: none"><li>State-of-the-art in industrial automation</li><li>Automation devices as CPS &amp; Industry 4.0 components</li><li>Industrial Internet of Things &amp; Automation services</li><li>Globalized &amp; collaborative work an real technical systems</li><li>New business models in the automation industry</li></ul> <p>Maximum of participants per training group: 3</p> <p>Duration of the training: (2 ... 8) weeks</p>

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# Production Engineering (5)

Name of the course	Description
<b>AUTOMATION live training</b>	<p>Under expert tutorage, course participants are given the opportunity to apply their knowledge to practical operational situations and to perform maintenance on a complex automation facility. Here the following activities are carried out:</p> <ul style="list-style-type: none"><li>Operation and maintenance of plants with various SCADA and DNC systems (WinCC, WebFactory, Visu+);</li><li>Bringing individual stations with PLC control systems into service (STEP7, PC WorX, CoDeSys);</li><li>Configuration and diagnosis of industrial communication systems (INTERBUS, CAN, Profibus DP, Profinet I/O, Bluetooth, WLAN);</li><li>Integration of new field devices in the automation system;</li><li>Energy-optimized operation in a industry-standard training &amp; re-search factory.</li></ul>

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# Production Engineering (6)

Name of the course	Description
<b>Digital media for training of complex technical systems</b>	<p>The course concentrates on the use and handling of those types of digital media that the student can use to acquire practical skills by conducting technical experiments. These include in particular interactive virtual learning environments as well as remote experiments on real technical plants. The course addresses the following technical aspects:</p> <p>Introduction in learning by simulations and virtual &amp; remote experimentations; Bringing plants into service, testing and diagnosis with interactive and dynamic 3D models; Training with hardware-in-the-loop (HiL) and software-in-the-loop (SiL) simulation of automation plants; Web-based remote experimentation on real technical as complement to traditional lab experience; Use of mobile devices (smartphones, tablets) and Smart Labs for learning purposes in technical fields.</p>

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# Production Engineering (7)

Name of the course	Description
<b>PROFINET in Industrial Application</b>	<p>Course participants use the knowledge they have acquired for the commissioning, configuration, operation, maintenance and diagnosis of faults in industry-standard production automation plants. The plant consists of five stations with which bottle caps are processed and applied to the bottles produced and filled in the Fab21 training &amp; re-search factory. The course addresses the following technical aspects:</p> <p>Configuration and parametrization of PROFINET I/O controllers;; Adaptation of PLC programs to PROFINET I/O devices; PROFINET/Ethernet communication for distributed PLCs; Operation and maintenance of a PROFINET system;</p>

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# Production Engineering (8)

Name of the course	Description
<b>PROFINET on Phoenix Contact platform</b>	<p>This course provides basic training in the development, operation, maintenance and diagnosis of the real-time Ethernet system PROFINET with the topics:</p> <p>PLC: Phoenix Contact (PC Worx); Implementation of Profinet IO Siemens; Study of different Gateways; Profinet/Profibus Profinet/CAN ; System integration.</p>

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# Production Engineering (9)

Name of the course	Description
<b>Quiz App for Production Engineering</b>	<p>After download and installation of the App on a Smartphone you can use the App for selftest in different topics in Production Engineering.</p> <p>Download the according questionnaire and test yourself.</p>
<b>PROFINET Remote Lab</b>	<p>PROFINET Remote Lab is a multi-functional education and training system for the real-time Ethernet communication system PROFINET based on sophisticated web technologies.</p> <p>The learning environment will supply the student with both offline and online lessons including remote lab units. Thus a student can first learn about the basics of PROFINET technology. Afterwards he might connect to an experimental assembly station for a live session.</p>

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# Production Engineering (10)

Name of the course	Description
<b>Einstieg in die Pneumatik</b>	<p>Dieser Kurs ist Voraussetzung für den Kurs: Pneumatik Grundlagen. Hier wird allgemein aber anschaulich erklärt, was unter technischer Pneumatik verstanden wird, wie und wo Pneumatik eingesetzt wird und was man so alles mit Pneumatik machen kann.</p> <p>Dieser Kurs endet mit einem Test. Wer den Test besteht, bekommt ein elektronisches Zertifikat - ein badge - und kann den Pneumatik Grundkurs besuchen.</p>

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# Quality Management (1)

Name of the course	Description
<b>8D Report</b>	(D is a structured and team-orientated problem solving approach. Often significant resources and efforts are used to fight recurring problems. By working through eight steps or disciplines the root causes of a problem will be systematically identified. This systematic and consequent approach will help to permanently stop a source of errors instead of only suppressing its symptoms. Therefore, 8D problem solving is a key capability for improving process and product quality while increasing performance.
<b>Basics of Poka-Yoke</b>	Poka Yoke is a technique for avoiding and detecting errors in the production process. It is one of the key factors of the Toyota production system, invented by Dr. Shigeo Shingo. Poka Yoke is based on the perception that no human has the ability to completely avoid unintended errors. Thus, Poka Yoke devices are implemented for error anticipation and detection as well as error treatment. In this way Poka Yoke helps manufacturers to improve their production quality, increase their efficiency and reduce product costs.

These courses are part of a wide range of technical courses offered by **GAMI**. It will be adapted to individual companies' need and is **subject to charge** according to conditions and customer's demands.

For learning more about the course please contact: (?)

# Quality Management (2)

Name of the course	Description
<b>7 Quality Tools</b>	Quality management system to ensure that a company and the entire production chain among the quality of products and services, let you get the competitive advantage of the basic process. The principles of quality management can be effectively developed in terms of supplier development. This course will introduce the seven major tools of quality management.

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# Quality Management (3)

Name of the course	Description
<b>Quality Management Introduction</b>	Quality management system to ensure that a company and the entire production chain among the quality of products and services, is a basic process that let you get the competitive advantage. The principles of quality management can be effectively applied in the development of suppliers. This course will introduce the basic concepts of quality management, quality development stage and management tools.

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# Quality Management (4)

Name of the course	Description
<b>Production Part Approval Process &amp; Advanced Product Quality Planning (PPAP and APQP)</b>	Production Part Approval Process (PPAP) is an important part of the product development process, allowing producers to evaluate the components and sub-systems which they receive from suppliers, and establishing confidence in the supplier's management systems. The PPAP process is designed to demonstrate that the component supplier has developed their design and production process to meet the client's requirements, minimizing the risk of failure by effective use of APQP. Advanced Product Quality Planning (APQP) is part of ISO/TS 16949. It's a structured method of defining and establishing the steps necessary to ensure the product meets the customer requirements and meanwhile enhance the networking of all involved parties to follow the timeline and finish the tasks on time.

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# Quality Management (5)

Name of the course	Description
<b>Systematic approach to failure prevention – Poka-Yoke</b>	Poka Yoke is a technique for avoiding and detecting errors in the production process. It is one of the key factors of the Toyota production system, invented by Dr. Shigeo Shingo. Poka Yoke is based on the perception that no human has the ability to completely avoid unintended errors. Thus, Poka Yoke devices are implemented for error anticipation and detection as well as error treatment. In this way Poka Yoke helps manufacturers to improve their production quality, increase their efficiency and reduce product costs.
<b>Six Sigma Green Belt</b>	The Six Sigma approach DMAIC (Define Measure Analyse Identify and Con-trol) provides all problem solving techniques in a systematic and structured way. It meets challenges and simplifies the creation of ideas and their implementation. Via DMAIC you can identify and remove the causes of defects and minimize variability in manufacturing and business processes. This results in improved quality and satisfied customers.

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# Quality Management (6)

Name of the course	Description
<b>Failure Mode and Effects Analysis (FMEA)</b>	FMEA is a systematic procedure for analysis of potential failure modes within a system. In FMEA, failures are prioritized according to how serious their consequences are, how frequently they occur and how easily they can be detected. As an important tool during Advanced Product Quality Planning (APQP) and one of the core tools for implementing ISO/TS16949 Standard, it is widely used in manufacturing industries in various phases of product life cycle.

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# Project Management (1)

Name of the course	Description
<b>Training within Industry</b>	The Training Within Industry is a technique that used for the development of supervision skills. A good supervisor is the key role to assure that the production goes smoothly, the quality are stable, the cost is under control and the people are always working safely. Therefore, 4 courses are developed to meet these requirements, which are Job Instruction (JI), Job Method (JM), Job Relation (JR) and Job Safety (JS) for 3 days. Meanwhile, TWI is a learning-by-doing approach. The trainer will use lots of practicing and games to motivate and meanwhile transfer the philosophy and methods to the participants
<b>7 steps to effective problem solving for a high performance team</b>	Problem solving technique with seven steps is one of the keys to a successful lean implementation because it empowers all of those involved. Lean manufacturing has a unique way of solving problems. It does not just look at the effect of the problem and tries to handle the false outcome. Rather, the root cause of the problem is identified and the root cause, as well as all contributing factors, is eliminated from the system, process or infrastructure in order to permanently solve the problems. In this training, you can have a comprehensive understanding of the concepts and methods of problem solving.

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# Project Management (2)

Name of the course	Description
<b>Improving workflow and efficiency in teams</b>	This course develops the skills of teams to describe workflows, to identify problems, find solutions to the problems, review solutions, to select solutions and to implement chosen solutions.
<b>Using web conferencing for synchronized learning</b>	This course explains and trains methods to transfer knowledge efficiently by using various technical and didactical options given by the appropriate technical tools.

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For getting more information or learning more about the course please contact: [Dragon@iao.fraunhofer.de](mailto:Dragon@iao.fraunhofer.de)