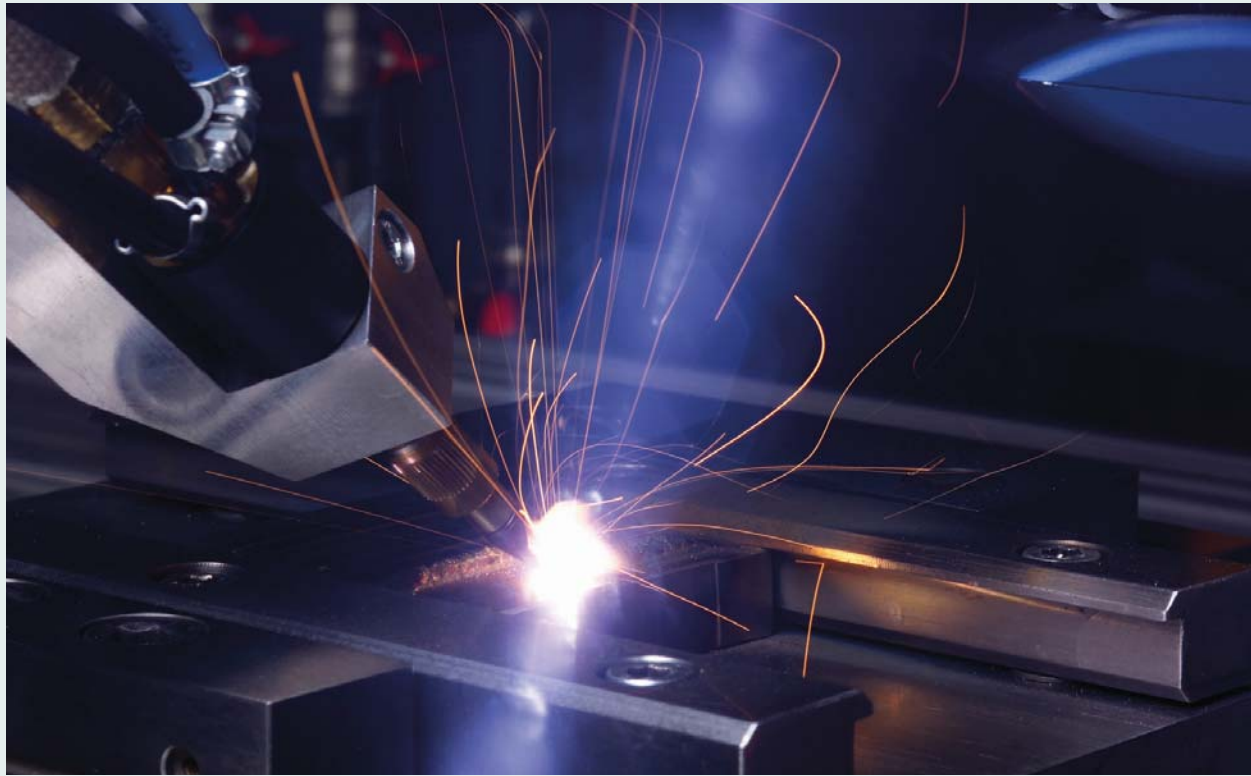


Certificate course



WBA  
WERKZEUGBAU  
AKADEMIE



## Expert Industrial Tool and Die Making

Technologies and strategies  
for a sustainable tool and die making

## Course overview

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### What we offer:

The certificate course 'Expert Industrial Tool and Die Making' of the WBA Aachener Werkzeugbau Akademie (WBA) contains essential core elements of industrial tool making and conveys to the participants concrete concepts and methods, with which traditionally more skilled tool-making companies can develop into industrial tool-making companies of international standard. Upon completion of the course, participants will be able to use current manufacturing technologies to optimize tooling processes, detect tool damage, and self-remediate. They acquire competences for the design, control and documentation of manufacturing processes as well as for the application of computer-aided design methods. Using the right models, participants will be able to plan, implement and optimize tooling services as well as independently develop and manage maintenance strategies. Furthermore, they learn to develop and implement automation solutions and apply numerical methods and simulation methods independently.

### Target group:

Manufacturing Professionals and Operational Leaders in Toolmaking at Mexican Automobile Manufacturers and Suppliers.





## Objective:

The increasing demand for highly complex tools poses a major challenge for the Mexican automotive sector. Currently neither OEMs and suppliers nor specialized toolmakers are able to meet the growing demand for new tools. WBA's „Expert Industrial Tool and Die Making“ training program aims to remedy this shortcoming and also provide tool repair and maintenance know-how. Faster availability of the tools needed will make WBA's offer to positively impact both the productivity and technical adaptability of the Mexican automotive sector.



## Key capabilities to be acquired:

In a total of 5 modules, course participants acquire in-depth knowledge and relevant competences in different thematic fields of industrial toolmaking:

- Manufacturing technologies: materials, processes, strategies
- Design theory as well as materials and surface technology: Foundations of manufacturing and materials technology, methods and procedures of surface technology and concept development in design
- Repair and service/maintenance: origin and repair of damages, maintenance as a service
- Process and project management/ work organization: design of manufacturing processes, planning and managing projects, work organization, logistics services and operational networks
- CAD-CAM-NC chain and automation / simulation: characteristics and problems, computer-aided design methods, possibilities of automation, applications of requirement-specific CAD and CAM methods, numerical methods, use of simulation methods



## Certificate and examination modalities:

The course 'Expert Industrial Tool and Die Making' is a WBA certificate course. The recognized certificate will be handed over after successful completion of the exam. Thorough preparation for the exam and meaningful training materials are ensured by the instructors. In case of failure of the test, a repetition is possible.



## Course concept:

The teaching and learning content is taught in the form of an innovative blended learning concept: classical classroom sessions with digital lectures, flipped classroom concepts, interactive workshops and live broadcasts, as well as teaching sessions that learners develop through self-study. The exact combination of the different teaching and learning methods will be adapted to the individual needs of the interested companies and the requirements of the course participants.

# Organizer

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**WBA  
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The certificate course „Expert Industrial Tool and Die Making“ is offered by the WBA Aachener Werkzeugbau Akademie. The WBA is active in the fields of research, industry consulting and training. It was founded in 2010 as a spin-off of the machine tool laboratory WZL of the RWTH Aachen and the Fraunhofer Institute for Production Technology IPT. With over 80 member companies (including Audi, Daimler, Hirschvogel, Rathgeber), it develops innovative solutions for toolmaking. By mapping the entire process chain of toolmaking, new solutions can be tested in our own state-of-the-art machinery. Accordingly, new ideas and technologies for the industry are being developed and piloted in the demonstration world of the WBA at the RWTH Aachen Campus. In this context, the WBA is built on its extensive international experience in consulting and continuing education in the automotive sector.



# Module Overview “Expert Industrial Tool and Die Making”

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## Module 1 Manufacturing technologies

In module 1 of the WBA certificate course, interconnections and procedures in sheet metal and massive forming are presented and load collectives in forming technology are discussed. In addition, the topic of plastic forming and the limits of injection molding tools will be covered intensely.

- **Topic 1: Conventional manufacturing processes**

The first topic area focuses on conventional manufacturing processes such as milling, drilling, turning, eroding and grinding. These manufacturing processes will be explored in depth, and characteristics of high-performance machining that contribute to increased productivity and efficiency will be addressed. Participants will learn, for example, how process parameters can be optimized.

- **Topic 2: State of the art in sheet metal and massive forming technology**

The second topic area deals with the state of the art and the presentation of new processes in sheet metal and solid forming. New developments in sheet metal separation will also be explained.

- **Topic 3: Forming of plastics**

In topic area three, process sequences, material properties, the corresponding physical foundations and machine and tool technology for the various forming processes for plastics are presented. The focus of this topic area is in particular on the processing of plastics and injection molding.



## Module 2 Design theory / materials and surface technology

In module 2, participants will gain an overview of the relevant foundations of materials technologies. They get to know the materials to be used and understand how the procedures are linked to form effective process chains. On this basis, methods and procedures of surface technology and for concept development in design theory are explained.

- **Topic 1: Materials**

The first topic area focuses on steel, aluminum, titanium and nickel alloys, which are frequently used in toolmaking. The aim is to build an understanding of the properties and machinability of materials and to demonstrate the variability of material properties through alloying elements and heat treatments. Participants will learn about the different material properties as well as advantages and disadvantages in order to be able to make a targeted material selection.

- **Topic 2: Methods for surface technology**

The second topic area provides information on methods for the defined generation and characterization of material surfaces and for influencing surface properties. Furthermore, participants acquire the material science knowledge that is necessary for surface technology and gain advanced knowledge in the field of coating technology.

- **Topic 3: Concept development for design**

A deepened understanding of the relevant solution methods for constructive tasks and methods for concept development are dealt with in the third topic area. In the end, participants master the systematics of designing technical products in the field of toolmaking.

# Module Overview “Expert Industrial Tool and Die Making”

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## Module 3

### Reparatur und Service/Instandhaltung

In Module 3 the participants gain in-depth knowledge on issues of tool damage and its characteristics. They will learn about repair options as well as product-related services and develop an understanding of how to plan and implement maintenance as a service.

- **Topic 1: Maintenance of technical systems**

Maintenance contributes significantly to added value. Thus, companies aim to avoid failures and to ensure uninterrupted functionality through the implementation of planned maintenance activities. Participants will be able to select an appropriate maintenance strategy, taking into account a given budget, current capacities and available resources. In addition, the most important key figures in maintenance as well as the use of data analytics are discussed.

- **Topic 2: Industrial services and their optimization**

The second topic provides the participants with a deep and detailed insight into industrial services and their optimization. The subject of this topic is the importance of services and innovations for the entrepreneurial success. In addition, established business models for services are provided. In a workshop and practical course, approaches for the evaluation of services and a conventional predictive maintenance are developed in practice.

- **Topic 3: Service Engineering**

The third topic is service engineering, the systematic development and design of services using appropriate models and methods. The participants will learn the basics of the services, taking into account current developments in science and practice. They will also learn how to interpret organizational structures and processes, and how to market and distribute developed services to limit risks and minimize costs.



## Module 4

### Process and project management / Work organization

In Module 4, the participants will gain in-depth knowledge of process and project management in toolmaking. They will understand how manufacturing processes in toolmaking can be designed, documented, controlled and improved, including the particular difficulties this entails. They will learn how to initiate, plan, steer and control projects and how to successfully complete them. In addition, the topic of work organization plays an important role. After the presentation of logistics services, it will be explained how operational networks are strategically developed.

- **Topic 1: Process and project management**

In the first topic, the focus is first on process management. Process management includes designing, documenting, controlling, and improving business processes. The focus here is on the three central issues of customer expectations and requirements, competition challenges and shareholder expectations. The second part of the topic deals with project management. The focus is on successfully initiating, planning, controlling, controlling and completing projects.

- **Topic 2: Work organization**

The work organization describes the delegation of responsibilities regarding tasks and the direct or indirect cooperation of persons with work objects as well as information and resources in an organization. A special focus is on workplace design. Participants will learn how to design a workplace so that it can be physically and mentally appropriate as well as performance-enhancing. In addition, various working time models are presented.

- **Topic 3: Logistics**

Logistics today occupies a key position within the company's task areas and has a significant impact on the company's performance. Initially, internal and external logistics services will be discussed and models of enterprise logistics will be presented based on them. It looks at in-house and cross-enterprise processes to help participants learn how to strategically design and plan operational networks.



## Module 5

### CAD-CAM-NC-Chain and Automation/Simulation

In Module 5, participants will acquire a broader understanding of the properties and problems of the CAD-CAM-NC chain in toolmaking. They will receive computer-aided design methods and will be able to apply requirement-specific CAD and CAM methods. The possibilities and limits of automation are also applied to the application possibilities of different simulation methods, simulation tools and the application of numerical methods.

- **Topic 1: Automation of plants and machines**

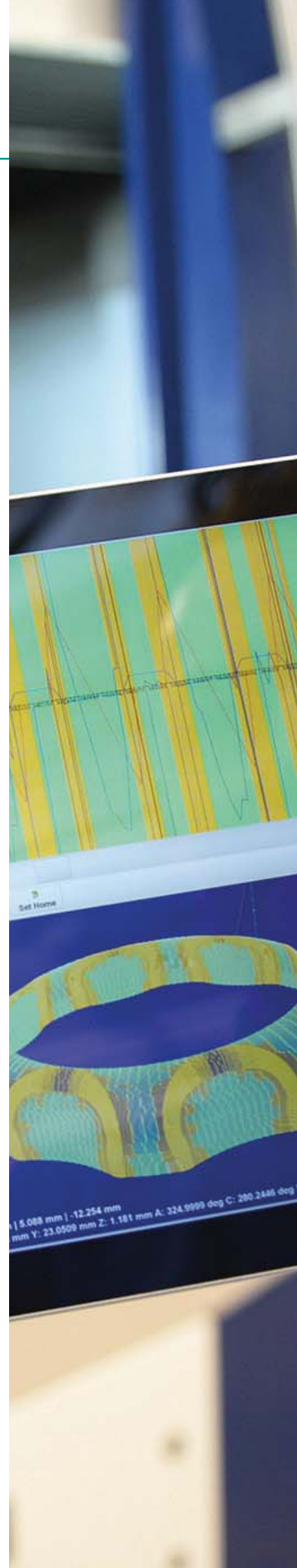
Automation refers to all measures for completely or partially autonomous operation of processes that are automatically controlled according to a previously created program without human intervention. This requires mechanization and control technology. The aim of the topic is to give the participants an overview of the status quo of automation in toolmaking as well as their goals and possibilities. The topic concludes with a specialization in control engineering to provide initial insights into the practical implementation of automation.

- **Topic 2: CAD / CAM with various PLM-, CAD- and CAM-systems**

In the second subject area, the construction of modern numerical control systems (Numerical Control, NC) will be presented. Afterwards, the participants will get an overview of the various NC programming procedures that can be used to program NC controllers in industrial everyday life. The advantages and disadvantages as well as the fields of application of the individual NC programming methods are highlighted. A special focus is placed on NC programming by means of CAM systems. Finally, they will look at Product Lifecycle Management (PLM) and PLM integration of manufacturing data.

- **Topic 3: Simulation**

The third topic is based on the second topic „CAD / CAM with different PLM, CAD and CAM systems“ and places a special focus on current simulation possibilities in practice. Participants will get to know the simulation types: toolpath-based and centered machine simulation, G-code-based and control-based machine simulation and the use of virtual machines. The conclusion of this topic is the advantages and disadvantages of the simulation as well as the essential challenges of virtual machines.





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Certificate course

## Expert Industrial Tool and Die Making

Technologies and strategies for a sustainable tool and die making

For the market launch in Mexico, we offer a special rate of € 1.100 plus tax for the Expert Industrial Tool and Die Making certificate course.\*

### ► Organisation

Duration of the course:	6 Days classroom training
Course location:	The Course will take place at various ITESM campuses in almost all Mexican states. We also offer the course in-house in your company.
Course fee (plus tax):	€ 1.750 / Person (€ 350 / Person / Day) Course materials, refreshments, lunches and two exclusive evening events are included in the price.

The composition and duration of the modules, subject areas and learning units can be individually adapted for your company. If you are interested in an in-house course, we can arrange appropriate discounts for you. An in-house course requires a minimum of 12 participants.

### ► Registration

We recommend a simple and quick online registration ([e-mas.de/kursanmeldung](http://e-mas.de/kursanmeldung) or [e-mas.de/registro-a-los-cursos/?lang=es](http://e-mas.de/registro-a-los-cursos/?lang=es)). Alternatively, contact us per e-mail, which is on our website ([e-mas.de](http://e-mas.de) or [e-mas.mx](http://e-mas.mx)). Of course, a reservation by telephone is also possible. If we do not receive the written registration within four weeks after the reservation, we reserve the right to assign your provisionally reserved place to another interested party. Registrations will be taken into account in the order in which they are received. If a registration is cancelled later than four weeks before the start of the event, a processing fee of 50% of the participation fee will be charged. If the organizer receives a cancellation later than two weeks before the start of the event, the full participation fee must be paid. The WBA reserves the right to cancel the course due to a shortage of registrations. The course fee will be refunded. The program is subject to alteration.

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\*The offer is valid until 15.02.2019 and is subject to availability.





# Program\*

# Expert Industrial Tool and Die Making

Technologies and strategies for the future of the toolmaking sector

Day 1 Tool Design and Materials	Day 2 Tool Technology and Manufacturing Fundamentals	Day 3 Tool Manufacturing
<p>08:30 – 09:00 Reception</p> <p>09:00 – 10:30 Basics of Tool Design Processes</p> <p>10:30 <i>Coffee break</i></p> <p>10:45 – 12:15 Standardisation in Tooling</p> <p>12:15 <i>Lunch break</i></p> <p>13:15 – 15:00 Tooling materials</p> <p>15:00 <i>Coffee break</i></p> <p>15:15 – 16:45 Wear mechanisms</p> <p>16:45 – 17:00 Review of the day</p> <p>19:00 – 22:00 <b>Dinner</b></p>	<p>08:30 – 09:00 Reception</p> <p>09:00 – 10:30 Metal Forming Processes</p> <p>10:30 <i>Coffee break</i></p> <p>10:45 – 12:15 Plastic injection processes</p> <p>12:15 <i>Lunch break</i></p> <p>13:15 – 15:00 Milling technology</p> <p>15:00 <i>Coffee break</i></p> <p>15:15 – 16:45 High speed cutting &amp; 5-axis machining</p> <p>16:45 – 17:00 Review of the day</p>	<p>08:30 – 09:00 Reception</p> <p>09:00 – 10:30 EDM technology</p> <p>10:30 <i>Coffee break</i></p> <p>10:45 – 12:15 Grinding and polishing technology</p> <p>12:15 <i>Lunch break</i></p> <p>13:15 – 15:00 Layout of manufacturing process chains</p> <p>15:00 <i>Coffee break</i></p> <p>15:15 – 16:45 Automation in tool making</p> <p>16:45 – 17:00 Review of the day</p>
Day 4 Surfaces & Repair	Day 5 Maintenance & Services	Day 6 Exam
<p>08:30 – 09:00 Reception</p> <p>09:00 – 10:30 Wear protection in tooling</p> <p>10:30 <i>Coffee break</i></p> <p>10:45 – 12:15 Surface modification &amp; coatings</p> <p>12:15 <i>Lunch break</i></p> <p>13:15 – 15:00 Innovative surface protection technologies</p> <p>15:00 <i>Coffee break</i></p> <p>15:15 – 16:45 Repair strategies in tooling</p> <p>16:45 – 17:00 Review of the day</p> <p>19:00 – 22:00 <b>Exclusive evening event</b></p>	<p>08:30 – 09:00 Reception</p> <p>09:00 – 10:30 Maintenance planning and scheduling</p> <p>10:30 <i>Coffee break</i></p> <p>10:45 – 12:15 Predictive Maintenance</p> <p>12:15 <i>Lunch break</i></p> <p>13:15 – 15:00 Review of the day</p> <p>15:00 <i>Coffee break</i></p> <p>15:15 – 16:45 Time for personal studies</p> <p>16:45 – 17:00 Q&amp;A session</p>	<p>08:30 – 09:00 Reception</p> <p>09:00 – 10:30 Exam Part I</p> <p>10:30 <i>Coffee break</i></p> <p>10:45 – 12:15 Exam Part II</p> <p>12:15 <i>Lunch break</i></p> <p>13:15 – 15:00 Looking into the future: Industry 4.0 and Smart Manufacturing</p> <p>15:00 <i>End</i></p>

\*This program is an example. Customized changes and adjustments are available upon request.

## Course instructor / Contact

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Carmen Halm supervised several national international bilateral projects in the university and research environment at RWTH Aachen University, the German Aerospace Center and the Frankfurt Institute for Advanced Studies including working in press and public relations. In addition, she has worked with a leading e-learning provider on continuing education through digital learning and training media. At the WBA Aachener Werkzeugbau Akademie, she heads the Continuing Education department with a comprehensive range of extra-occupational training formats for toolmaking.

If you have any questions or suggestions regarding the E-Mas continuing education program or the WBA certificate course Expert Industrial Tool and Die Making we look forward to hearing from you!

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