

E-Mas



Continuing Education for the Production Management in the Mexican Automotive Industry



Introduction

The Mexican automotive industry is booming – there is no doubt about it. However, the development towards one of the most important car producers in the world has to overcome many new challenges. The change to more complex production processes, the trend to highly individualized products as well as an intense international competition require a consistent further development of skills and expertise of employees. Automobile producers and suppliers in Mexico must adapt for more versatile production processes and more complex work processes to ensure that their Mexican production facilities will remain internationally competitive in the future.

Therefore, active companies in Mexico are required to address the transformation towards Industrie 4.0 and to qualify their employees with regard to the changes of the working environment. At this point, the E-Mas programs' courses come into play: Specialists, personnel developers and operative managers of the Mexican automobile industry acquire valuable knowledge and skills of tactical and operative production management by means of a modern, innovative advanced training. They will learn to increase productivity, improve production processes, promote learning at the workplace and ensure the health of employees.

Do you want to train your employees and managers efficiently and effectively in this content? Then take advantage of the extensive range of courses offered as part of our E-Mas program: The Institute for Industrial Management at RWTH Aachen University (FIR), the MTM Association (MTM), the WBA Aachener Werkzeugbau Akademie (WBA), the Lean Enterprise Institute (LEI) in cooperation with the local partner Instituto Tecnológico y de Estudios Superiores de Monterrey (ITESM) provide together as an international team an innovative advanced training program dealing with four highly relevant topics of production management.

Decision makers and managers at middle management levels, to whom the course offer is addressed, are actively prepared for future tasks and are enabled to integrate learning opportunities into daily work processes, implement human-oriented production management, professionally apply appropriate lean-management methods for Industrie 4.0 and produce the necessary tools according to the latest level of knowledge. With our advanced training program E-Mas, your employees will learn the required skills that your company needs for an effective and efficient production during the transformation towards Industrie 4.0.



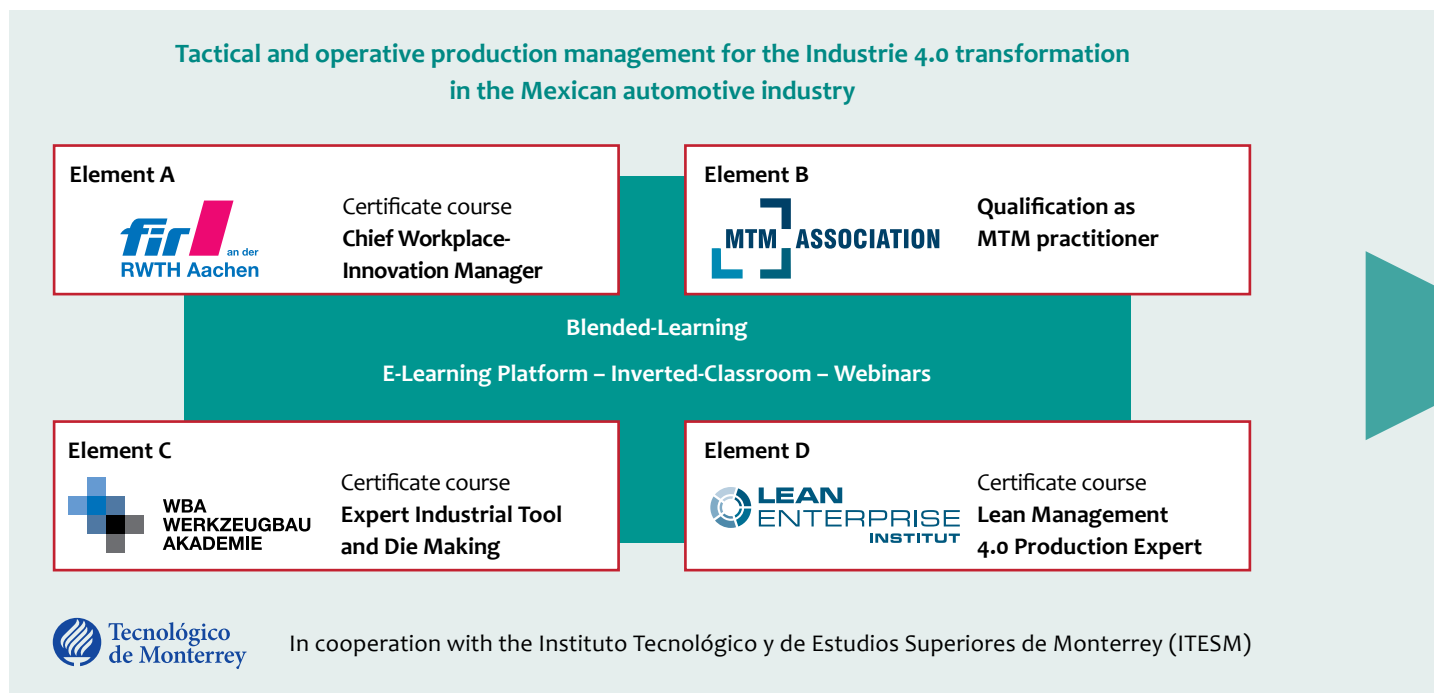
Customized further education

Your path to an effective and efficient production of tomorrow!

Through the E-Mas training program we will give your employees a further training in the field of tactical and operative production management by means of selected, latest didactical methods and teaching content. In order to achieve this, we offer you a highly individualized training in a blended-learning concept. With the help of the courses included in E-Mas, the participants will quickly acquire well-founded expertise in the following subjects:

- **Effective and efficient work design enhancing employee's learning processes (FIR)**
- **Innovative human-oriented productivity management (MTM)**
- **Modern tool and die manufacture management (WBA)**
- **Industrie 4.0 Lean-methods (LEI)**

After completion of the E-Mas program, the participants are in the position to implement independently and successfully select the appropriate measures to improve production processes and increase effectiveness and efficiency of the companies. Overall, E-Mas contributes to strengthening competitiveness of the participating companies at their Mexican locations.



Our program is optimally suited for:

- Professionals and managers responsible for production and transformation processes as well as production team and group leaders.

Within E-Mas the participants will:

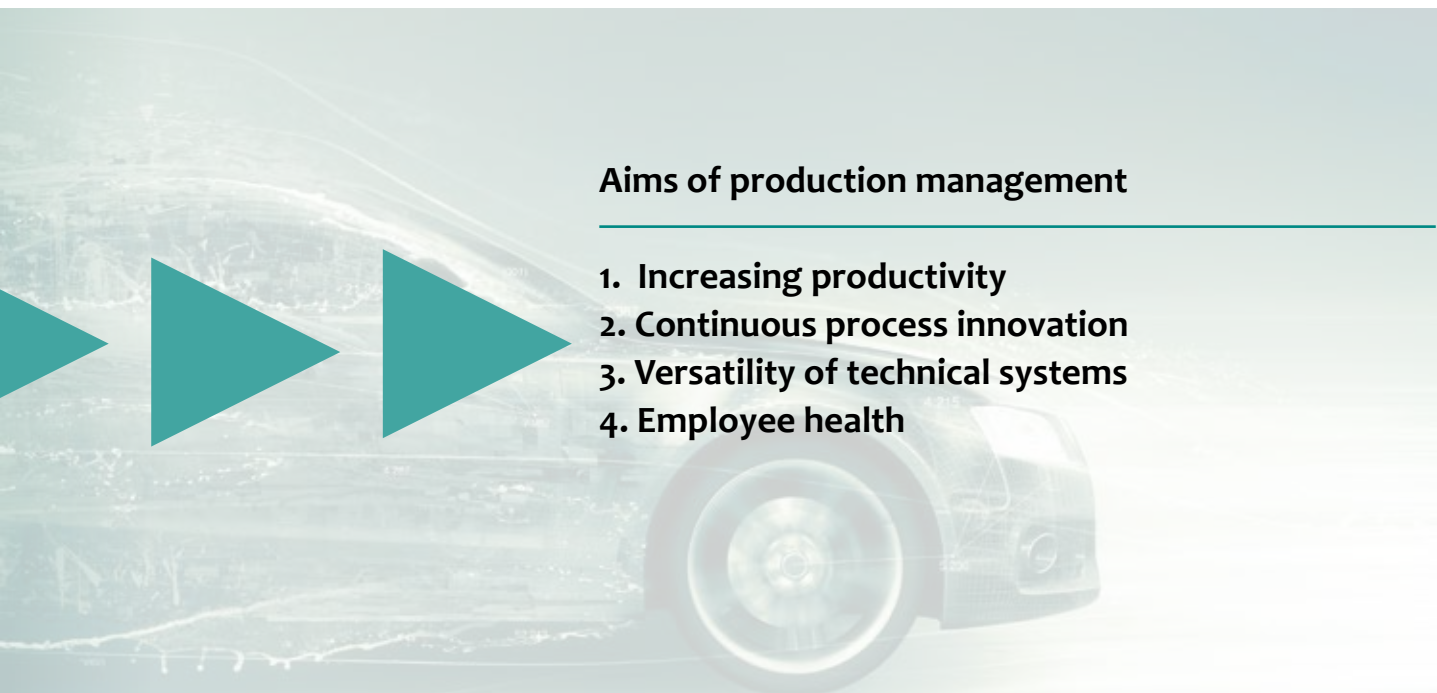
- find out how to optimize work processes using appropriate tools and methods
- learn how to prepare their employees for long-term work in a constantly changing production environment
- discover which measures can be taken in order to improve production processes and to maintain employee health
- acquire knowledge of how to optimally design the German-Mexican cooperation in or between companies
- further develop their management skills by using renowned teaching content and innovative methods.

Course objectives and conception of E-Mas

The E-Mas training program is intended to counteract the increasing shortage of skilled workers on middle management levels of many automotive manufacturers and suppliers. The offer is aimed at professionals, personnel developers and operative managers. Participation in E-Mas enables them to successfully assume and execute tasks and activities on middle management level. By providing high-quality teaching and learning content in form of an innovative blended-learning concept, companies and employees will be able to quickly achieve the following management objectives and sustain them independently in the future:

1. Increasing productivity
2. Continuous process innovation
3. Versatility of technical systems
4. Employee health

The aim is not only to achieve an increase in production with higher manufacturing quality and a lower error rate, but also to strengthen competitiveness of the company as a whole. The E-Mas targets are covered by the individual courses of the training four providers. The joint advanced further education offer is designed to ensure a demand-based, effective and efficient transfer of knowledge.



Aims of production management

1. Increasing productivity
2. Continuous process innovation
3. Versatility of technical systems
4. Employee health

Course concept

The complete offer and the individual courses are designed as certificate courses. After successful completion of the course, the participants receive an appropriate certificate. The compilation of the modules and teaching units is developed individually for each of the interested companies and tailored to their needs. Courses can be organized on site or at facilities of our local partner ITESM. The aim of the individual courses is to impart well-founded theoretical knowledge and to deepen it with everyday practical examples from the industry. Problem-based learning concepts are used for this purpose. In addition, workshops are held in which the participants actively apply and consolidate what they have learned. The courses are offered according to didactic and pedagogical aspects in form of a blended-learning concept, i. e. modern, digitally supported forms of teaching and learning are combined with classical analog and face-to-face courses. The course participants are assisted in selecting a combination of course content tailored to their concrete applications and target formulations.

Organization



Institute for Industrial Management at RWTH Aachen University (FIR) coordinates the overall E-Mas program and will organize one of the four courses. The FIR is a non-profit, cross-sector research and educational institution at RWTH Aachen University with about 120 staff members and is considered as one of the leading German research institutions in the field of business organization and industrial management for more than 60 years. In addition, it is concerned with the organization of corporate IT with the aim to establish the organizational basis for the digitally integrated industrial enterprise of the future. The institute accompanies, researches and teaches in close cooperation with industrial partners in the fields of Service Management, Business Transformation, Information Management and Production Management. As an internationally recognized institute and a long-term partner of the German automotive sector, FIR takes over the responsibility as the main contact for the E-Mas program.



The MTM Association e. V. (MTM) is another partner of the E-Mas consortium and contributes with a course to the E-Mas program. The MTM, based in Hamburg, was founded in 1962 as a non-profit, scientific-technical association. MTM has more than 500 members of which approximately 250 member companies represent about 2.75 millions of employees in Germany. MTM's special expertise is the productivity management in industry, services and administration. Hereby the main objective is to reach the optimal combination of efficiency and ergonomics in work processes. In the field of Industrial Engineering, the scientific methods and tools of the MTM rank among the most important international standards in the automotive sector. Considering only the German automotive sector MTM certificates currently about 2.000 participants in their training programs annually.





**WBA
WERKZEUGBAU
AKADEMIE**

The WBA Aachener Werkzeugbau Akademie (WBA) is a further course provider within the E-Mas training program. The WBA is engaged in the business areas research, industrial consultancy and training and was founded in 2010 as spin-off of the Laboratory for Machine Tools and Production Engineering WZL of the RWTH Aachen University as well as of the Fraunhofer Institute for Production Technology IPT. Together with over 80 member companies (among others Audi, Daimler, Hirschvogel, Rathgeber) the WBA develops innovative solutions for tool and die making. By modelling the complete process chain of tool and die making, new concepts and technologies can be developed and piloted in the demonstration world of the WBA on the RWTH Aachen Campus. The WBA can build on vast international experiences within the automotive sector in its field of expertise.



Another course within the E-Mas training program is offered by the Lean Enterprise Institute (LEI), founded in 2010. The LEI, aims at supporting and enabling companies from all sectors and their executives on their way to an optimal application of lean methods by means of seminars, business-games and individual coaching. The LEI places a special focus on the development of lean management regarding a successful change towards Industrie 4.0. In addition to open seminars and courses, the LEI offers in house seminars and the joint implementation of lean projects at companies. By this the LEI has established itself as a key partner to the German automobile producers and suppliers concerning coaching and training in the past years.



The Instituto Tecnológico y de Estudios Superiores de Monterrey (ITESM) is the most important private university in Mexico and supports the implementation of this continuing education program in Mexico. Tecnológico de Monterrey was founded in 1943, has more than 30 regional campuses, more than 90,000 students enrolled and is recognized as one of the best business schools in the world. The Tecnológico de Monterrey will be available as a local contact and will provide its facilities in the Metropolitan Area of Mexico City (Mexico City Campus, Santa Fe Campus and State of Mexico Campus) as part of the E-Mas program. ITESM will introduce its experience to the E-Mas program and support partners to appropriately develop the continuing education program according to the needs of the Mexican market. In addition, ITESM offers excellent conditions for the successful completion of the E-Mas program through its multi-campus infrastructure in various places close to the auto industry groupings in Mexico.

E-Mas offers much more!

E-Mas associated partner network

Get to know the benefits that you receive as E-Mas associated partner! You benefit from:

- Mediation for highly qualified and motivated graduates, as well as, projects and final theses.
- Events for companies, education providers, research institutions and other organizations around the Mexican automotive sector
- Access to continuing education opportunities beyond the E-Mas program
- Provision of dedicated market studies for the automotive sector in Latin America
- Regular newsletters about trends and developments in the Latin American automotive sector
- Qualified consulting service for the automotive sector
- Exchange of knowledge and experiences within E-Mas network



Certificate Course



Chief Workplace-Innovation Manager

Integrating competence development and
production processes – Designing work prospectively

Overview of the certificate course

What we offer:

The certificate course “Chief Workplace-Innovation Manager” of the Institute for Industrial Management at RWTH Aachen University (FIR) provides participants extensive expertise in the fields of competence development for the transformation towards Industrie 4.0, leading by objectives and creating learning enhancing work environments, integration of competence development and work processes as well as comparative management approaches to successful managing German and Mexican cultural differences. After completing the course, participants are able to proactively identify future competence requirements through appropriate tools and methods and also design and tailor the learning processes of their employees quicker as well as more focused. In addition, they learn to combine Mexican mentality and German corporate culture, mastering the resulting challenges and exploiting potentials. Through the combination of the necessary basics, proven methods and current case studies, as well as the integration of top-class expertise from science and practice, the course participants are enabled to design the best possible working and learning processes for their employees and actively support change processes in their company.

Target group:

Specialists and operative executives in the fields of work design, production management and human resources management.



Foto: © shutterstock



Course objective:

The main topic of the certificate course offered by the FIR is “Integrating competence development and production processes – Designing work prospectively”. In accordance with this objective, the course aims to develop the necessary competences for a successful design of the industrial transformation towards Industrie 4.0 at an early stage for operational managers and thus also for their employees. A special focus is placed on enhancing learning in work processes by means of technology-based and classic work integrated learning approaches. Moreover, implications and approaches for dealing with socio-cultural differences between Germany and Mexico will be discussed. After completion of the course, your operational managers will be able to optimize employees’ engagement, significantly reduce their training time and increase their flexibility through the learned content and methods. They can also make a valuable contribution to reducing employee turnover.



Key skills to be acquired:

Participants of the course learn to:

- understand the changes resulting from the transformation towards Industrie 4.0,
- initiate change processes of existing work systems self-confidently and at the same time to motivate staff members,
- apply adequate leadership concepts,
- evaluate the competences of the staff members professionally and to recognize development potential at an early stage,
- recognize and evaluate learning potentials during the work process,
- select and implement appropriate measures for work-based learning processes,
- identify challenges and potentials in differences between the German (corporate) and Mexican culture,
- overcome cultural differences and to create synergies.



Certificate and examination modalities:

The course ‘Chief Workshop-Innovation Manager’ is designed as a certificate course. The certificate will be awarded on the last day of the course after successfully passing the examination. Thorough preparation for the exam and informative training materials are guaranteed by the lecturers. A repetition of the examination is possible in case of failure.



Course concept:

The teaching and learning content is conveyed in the form of an innovative blended-learning concept: classical face-to-face units are combined with digital lectures, flipped classroom concepts, interactive workshops and live broadcasts. Consequently, there will be also units in which the learners work out through self-study. The precise combination of different teaching and learning methods is adapted to the individual needs of the interested companies and the requirements of the course participants.

Organization



The certificate course Chief Workplace-Innovation Manager is offered by the Institute for Industrial Management at RWTH Aachen University (FIR). The FIR is a non-profit, intersectoral research and educational institution at RWTH Aachen University with about 120 staff members and is considered one of the leading German research institutions in the field of business organization and industrial management for more than 60 years. In addition, it is concerned with the organization of corporate IT with the aim to establish the organizational basis for the digitally integrated industrial enterprise of the future. The institute accompanies, researches and teaches in close cooperation with industrial partners in the fields of Service Management, Business Transformation, Information Management and Production Management. Within the framework of the Campus Cluster Smart Logistics, which we are responsible for at the campus of RWTH Aachen University, we have our own pre-series production of electric vehicles in the Demonstrationsfabrik Aachen (DFA). In addition, our Mexican courses are based on our long-term experience in research and consulting projects with German automotive manufacturers and suppliers.



Module overview “Chief Workplace-Innovation Manager”



Module 1

Shaping the change to Industrie 4.0

What is Industrie 4.0 all about? What are the changes concerning production of tomorrow? How can change processes actively be designed and the employees motivated? These and similar questions are dealt within the first course module, which is at the beginning of the FIR certificate course. Participants will be given an overview of Industrie 4.0 and the resulting changes regarding the Mexican automotive sector will be discussed. Based on these basics, which are realized by live broadcasts from the Industrie 4.0 pre-series production of electric vehicles in the Demonstrationsfabrik Aachen (DFA), the course participants will learn methods and tools of change management and transformational leadership.

- **Topic field 1: Industrie 4.0**

The first topic field deals with the change to Industrie 4.0 and gives the course participants a comprehensive insight into changes that will significantly shape the design of work and production processes, and thus also the competence requirements of employees in the future. Based on the Industrie 4.0 maturity level model of the FIR, the topics information technology, corporate structure, corporate culture and human resources, as well as their developmental stages and their interactions with each other are examined. For this purpose, theoretical learning units are combined with practical exercises.

- **Topic field 2: Change Management**

The second topic field deals with change management. Against the background of the basics worked out in the previous course, participants learn to recognize independently necessary change processes, to initiate, implement and evaluate them with regard to their success. A special focus is placed on conveying strategies and concepts for the project management of change processes and creating an awareness of the participants' role as role models and learning coaches for their employees. Methods and tools of transformational leadership are acquired and tested in practical applications accordingly.

Learning goals: The course participants will learn about the changes that accompany the transition to Industrie 4.0 and will be able to identify development potential and interactions at an early stage. In addition, the course participants acquire comprehensive key competences for the successful planning and implementation of complex change processes and are able to motivate their employees and support them as learning coaches.

Module overview “Chief Workplace-Innovation Manager”



Module 2

Work design and competence development that promotes learning

The immense growth and increasing complexity due to industrial change and a continuing education and training system that is not yet able to meet the constantly increasing demand for qualified employees in the industry mean that competence development is currently one of the key challenges in the Mexican automotive sector. In particular, work-related competence development and work design that promotes learning can make a significant contribution to build up the required competences quickly, efficiently and effectively. This is where the second module of the FIR certificate course begins. Course participants learn how to identify and evaluate the competences of their employees, define development needs and select and implement work-related learning solutions in a targeted manner. In addition to an innovative mediation by means of a tailor-made combination of e-learning and face-to-face courses, the module covers a variety of current practical examples.

- **Topic field 1: Work-related learning**

In this topic field the basics of work-related learning are taught. Course participants will be given an overview of both classic work-related and technology-supported forms of learning. Their suitability regarding a practical application will be discussed in the form of use-case based workshops. Furthermore, the necessary framework conditions for work-related learning will be presented including measures which can contribute to an improvement of learning processes in production. The course participants acquire basic didactic knowledge in order to make work processes more conducive to learning. For this purpose, best practice examples are used which describe the successful establishment of learning solutions and learning routines. Moreover, the integration of technology-enabled learning forms into digitally networked work environments will be discussed.

- **Topic field 2: Skills development 4.0**

The second topic field is focused on future and demand-oriented skills development. The course participants learn to analyze and evaluate the skills and knowledge of their employees on the basis of a competence model suitable for their context. In addition, they are enabled to identify development needs and define corresponding development goals. Moreover, this analysis and evaluation will help them to select work-related competence development measures for their employees or to make use of existing further training opportunities in the company. Furthermore, the course participants learn how to promote and evaluate the success of competence development measures by appropriate methods and tools.

- **Topic field 3: Implement work-related competence development**

With the help of the third topic field, participants will learn how to successfully integrate technology-supported and classical learning solutions for competence development into existing work systems. In this context, the course participants also learn with which leadership behavior they can promote work-related learning among their employees and with which measures the motivation for learning in the work process will be increased. In total, three learning units are planned to provide participants with a step-by-step introduction to all aspects of implementing learning solutions. They learn this, for example, by means of a business game developed by FIR, in which the implementation steps can be followed and practiced.

Learning goals: The course participants develop a profound understanding of how important continuous learning processes are for the success of a company. In addition, they are able to implement work-related competence development in their departments and teams in a demand and future-oriented manner. They will know how to assess the competencies of their employees in a goal-oriented manner and how to evaluate them in a meaningful way. On the basis of the learned analysis steps, they can define necessary measures in their departments and have comprehensive knowledge of how to improve learning processes on the shop floor. According to this, they can select and implement appropriate work-related learning solutions and evaluate their success.

Module 3

Comparative management in an international context

One of the central challenges in the Mexican automotive sector is to combine the corporate culture of international automotive manufacturers and suppliers with the culture of Mexican society. At the same time, negative effects such as the high fluctuation rates of employees, which can arise due to problems in cooperation in view of cultural differences, must be counteracted. Accordingly, in this third module of the FIR certification course, the participants work out cultural similarities and differences. They will be enabled to use these skills in order to achieve common goals within the company. The essential methods and tools of Comparative Management are discussed in order to identify the socio-cultural potentials and challenges regarding international cooperation, using the example of German-Mexican cooperation in the automotive sector, to overcome obstacles and to create synergies. The theoretical contents of the module are taught via e-learning and classroom courses by using specific application examples in the workshops.

- **Topic field 1: Operating and negotiating in an international environment**

This topic area deals with the intercultural management requirements that arise when German, or other international companies, are active in the Mexican automotive sector. The course participants are being qualified for professional management in this environment. The subject area offers interactive practical methods for the course participants in order for them to identify challenges in their daily work and cope by applying the intercultural skills they have learned.

- **Topic field 2: International communication and negotiation**

German-Mexican cooperation in particular often leads to communication difficulties. By illustrating renowned communication models, course participants expand their communication and behavioral repertoire. They are enabled to understand the differences in the interests and expectations of their employees and managers, which are also influenced by culture. Role-plays are used to simulate and test various communication situations, such as critical discussions or feedback. Thus, the course participants learn strategies and tools for their respective international working context.

- **Topic field 3: International Management**

In this subject area, the differences and similarities of the individual work contexts of the course participants are dealt with practically. A compensation and benefits system to strengthen employee loyalty is developed with the help of recognized culture management models. By using case studies and critical incidents, the participants apply their knowledge in a practical way. In addition, best-practice examples are used in order to support the participants by transferring these examples to the work processes of their respective companies. After the course has been completed, an online tutorial accompanies the sustainable implementation of individual and needs-oriented intercultural management in the company-

Learning goals: After completing this module, the course participants will be familiar with the relevant differences and similarities between Germany and Mexico with regard to corporate culture and the respective management approaches. They are able to fulfill their function as an interface between primarily Mexican employees in each of their areas of responsibility on the one hand and a more culturally German-oriented corporate management on the other hand. In addition, the of the course participants' understanding regarding their function as intercultural learning coaches is strengthened in the long term.





Certificate Course

Chief Workplace-Innovation Manager

Develop competencies, integrate them into the job and organize it prospectively

► Organization

Duration of the course:	5 Days classroom training
Course location:	Different ITESM campuses located in almost all the states of the Mexican Republic We also offer the course in-house in your company.
Course fee (plus taxes):	1.750 € (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 a customized quotation. An in-house course requires a minimum of 12 participants.

► Registration

We recommend a simple and quick online registration (<https://e-mas.de/course-registration/?lang=en>). Alternatively and for more information, you can contact us on the website (<https://e-mas.de/contact/?lang=en>). A reservation by telephone is also possible. If we do not receive the written registration within four weeks after the reservation by telephone, 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 FIR 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.



Course Itinerary*

Chief Workplace-Innovation Manager

Develop competencies, integrate them into the job
and organize it prospectively

Day 1: Module 1 Shaping the change to Industrie 4.0	Day 2: Module 2 Work design that promotes learning and competence development	Day 3: Module 2 Work design that promotes learning and competence development
<p>09:00 – 09:30 Welcome</p> <p>09:30 – 11:00 Innovative approaches to work and production processes in the transformation towards Industrie 4.0</p> <p><i>11:00 Coffee break</i></p> <p>11:15 – 12:45 Opportunities and challenges of the Industry 4.0 for the Mexican automotive sector</p> <p><i>12:45 Lunch</i></p> <p>13:45 – 15:45 Workshop: Best practices for leadership on the shop floor</p> <p><i>15:45 Coffee break</i></p> <p>16:00 – 18:00 Approaches and tools for Change Management in the production</p> <p>19:00 – 22:00 Get-together</p>	<p>09:00 – 11:00 Introduction to work-oriented learning processes</p> <p><i>11:00 Coffee break</i></p> <p>11:15 – 12:45 Work organization and tasks</p> <p><i>12:45 Lunch</i></p> <p>13:45 – 15:45 Leadership and communication</p> <p><i>15:45 Coffee break</i></p> <p>16:00 – 17:30 Development of competencies</p>	<p>09:00 – 11:00 Learning culture, learning solutions and technical infrastructure</p> <p><i>11:00 Coffee break</i></p> <p>11:15 – 12:45 Implementation of learning solutions</p> <p><i>12:45 Lunch</i></p> <p>13:45 – 15:45 Workshop Design Thinking I</p> <p><i>15:45 Coffee break</i></p> <p>16:00 – 17:30 Workshop Design Thinking II</p>
Day 4: Module 3 Comparative Management in an international context	Day 5: Module 3 Comparative Management in an international context	
<p>09:00 – 11:00 Introduction to Intercultural Management</p> <p><i>11:00 Coffee break</i></p> <p>11:15 – 12:45 Constructive approach to cultural diversity</p> <p><i>12:45 Lunch</i></p> <p>13:45 – 15:45 International communication and negotiation</p> <p><i>15:45 Coffee break</i></p> <p>16:00 – 18:00 Intercultural management dimensions – similarities and differences</p> <p>19:00 – 22:00 Exclusive evening event</p>	<p>09:00 – 11:00 Corporate culture in an international environment</p> <p><i>11:00 Coffee break</i></p> <p>11:15 – 12:45 Improvement of employee bonding within competitive industries</p> <p><i>12:45 Lunch</i></p> <p>13:45 – 15:15 Establishing an individual intercultural management concept</p> <p><i>15:15 Coffee break</i></p> <p>16:00 – 17:30 Written exam</p> <p>17:30 – 18:00 Summary and farewell</p>	

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

Course instructor / Contact



Drs. Roman Senderek
Institute for Industrial Management at RWTH Aachen University
Campus-Boulevard 55
52074 Aachen · Germany
Telephone: +49 241 47705-225
E-Mail: Roman.Senderek@fir.rwth-aachen.de
Web Page: www.fir.rwth-aachen.de

Roman Senderek holds a degree in economics with an emphasis on international management from the Maastricht University School of Business and Economics (Netherlands) and the Universidad de los Andes in Bogotá (Colombia). He worked as a project manager in various German and Latin American companies before joining Institute for Industrial Management at RWTH Aachen University as a project manager. As part of his work at the FIR, Mr. Senderek has built up the research field of work and competence development and has been involved in various national and international projects, e. g. in the automotive sector, in work-related learning processes and the creation of work processes conducive to learning.

If you have any questions or suggestions regarding the E-Mas training program or the FIR certificate course Chief Workplace Innovation Manager, we look forward to hearing from you.

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Bundesministerium
für Bildung
und Forschung

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Deutsches Zentrum
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Projektträger im DLR

www.e-mas.de
www.e-mas.mx



MTM-Practitioner

Productive and healthy work

Qualification for MTM-Practitioner

What we offer:

The MTM ASSOCIATION (MTM) offers courses to achieve the MTM-practitioner qualification. With the MTM practitioner and the associated reputation, the MTM offers the world's most widely used quality hallmark in industrial engineering! The MTM practitioner is the guarantor for MTM's compliance accordingly, being the contact person for works councils, employees and executives to design the MTM application in the company.

Target group:

Specialist and operational executives from the fields of industrial engineering, planning, time management, work preparation, production, logistics, occupational safety and health, product and equipment construction as well as the works council and other interest groups.

Course objective:

The goal is the completion of the qualification as MTM practitioner and the awarding of the „Blue Card“ MTM.

The MTM practitioner is the expert in the enterprise to use MTM and master:

- The recognition and evaluation of potential for improvement
- The planning and implementation of design and improvement projects
- The ergonomic and economical work design.





Key skills to be acquired:

Qualification as an MTM practitioner conveys knowledge and skills for the application of the MTM process, in particular the application of the individual MTM process module systems for the planning, design and optimization of processes, work systems and products.

Operational tasks of the MTM practitioner are:

- Organization of improvement workshops & implementation support
- Work allocation & personnel needs assessment
- Method planning & work instruction
- Process planning & workplace design
- Default time calculation & processing of time complaints
- Compliant MTM application & expert for the MTM application

Certificate and examination modalities:

The individual certified training courses for the MTM practitioner conclude with a written examination. The Blue Card MTM is the qualification as MTM practitioner and is the internationally recognized certificate of competence for the practical application of the MTM process for the design and improvement of processes and work systems.

- Validity: 3 years
- Recognized by the social partners
- Anchored in numerous company agreements

For all MTM trainings, the MTM Training and Examination Regulations describe the admission requirements, training principles, learning contents and learning objectives, training and examination documents as well as the valid valuation guidelines.

Course concept:

The teaching and learning contents are taught in the form of face-to-face lectures with a high practical training share. The MTM-1 training as an e-learning course is being developed.

Module overview “MTM Practitioner“



The road to become a MTM Practitioner:

MTM-1

Provides the fundamentals of work design with MTM as well as knowledge and skills for the ergonomic and economic design of human work based on basic movements of the hand-arm system, the eyes and the whole body including the basics of method planning and target time determination - based on the MTM-standard performance.

Further MTM process block system

Provides knowledge and skills for efficient, operational MTM application. The MTM practitioner masters at least one MTM process block system:

- MTM-SD: Standard data for mass production
- MTM-UAS: Universal analysis system for series production
- MTM-MEK: MTM for single and small batch production
- Operational process block systems

MTM-Practitioner

Conveys MTM application practice as well as knowledge and skills for the determination of potential, work design and data collection as well as project planning and implementation. In public or company-internal training, the practical application of MTM is carried out in real workplaces. The MTM also offers in house “Coaching on the job“, in which a design project in the company is supervised by an MTM instructor. After successful completion of these certified training courses, the participant will receive the “Blue Card“ MTM with a validity of three years.





Admission requirements

There are no special entry requirements for participation in the MTM-1 (MTM Fundamentals) course.

Subject

The MTM-1 training provides in-depth knowledge and skills in the application of MTM-1 and the importance of using MTM process block systems.

Content

- Historical development of MTM
- Meaning of the classification of the MTM process block systems
- Basic MTM movements (content delimitation and influencing factors) as well as their practical application and significance for higher aggregated MTM process block systems
- Rules for uniform and correct use of the process block system MTM-1
- Practical exercises for reducing application errors or increasing application security in the MTM-1 process block system

Learning goals

The participant will know:

- the development and construction, the areas of application and prerequisites for MTM-1,
- the classification of MTM-1 into the systematics of the MTM process block systems, the fields of application as well as their similarities and differences,
- the basic MTM movements and their fundamental importance for the higher aggregated MTM process block systems,
- the degrees of MTM training (eg Blue Card) and their international significance,
- other MTM methods, such as ProKon, EAWS and TiCon.

The participant will be able to:

- create MTM-1 analyzes independently and have a safe handling of the MTM-1 rules,
- apply MTM-1 uniformly and properly,
- assess which MTM process block systems he / she can use sensibly in his / her professional environment,
- assess which continuing education is appropriate for his / her professional background.

Training duration

The duration of MTM-1 training is 80 hours.

Examination

The training in MTM-1 concludes with a written exam. In exceptional cases, an additional oral examination may be required by the examination board.

Certificate

After passing the MTM-1 exam, a certificate will be issued. In case of a failed exam, this will be communicated in a separate letter and a neutral certificate of attendance will be issued instead of a certificate.

Module overview “MTM Practitioner“



MTM-UAS (as an example for a MTM process block system)

Admission requirements

Participation in the training MTM-UAS (Universal Analysis System) requires the successfully passed examination in MTM-1.

Subject

The MTM-UAS training provides knowledge about the content and structure of the MTM-UAS process block system, consisting of MTM-UAS basic operations and MTM-UAS standard operations for mass production as well as the skills required for their application.

Content

- The MTM-UAS process block system and its development background
- Principles of development and structure and content of the MTM-UAS primitives and MTM-UAS standard operations
- Rules for uniform and proper use of the MTM-UAS process block system
- Practical exercises to strengthen imparted knowledge

Learning goals

The participant will know:

- the MTM-UAS process block system and the development background,
- the classification of MTM-UAS in the classification of the MTM process block systems,
- the significance of the method level in process type 2 and its influencing factors,
- the application requirements and application areas of MTM-UAS,
- the principles of development and description of standard processes in series production.

The participant can practically apply the MTM-UAS process block system, in particular to the:

- structuring, planning and design of processes and work systems,
- description and evaluation of processes,
- uncovering design potential in the planning and improvement of processes and work systems.

Training duration

The duration of training MTM-UAS is 40 hours.

Examination and certificate

The MTM-UAS training concludes with a written exam. After passing the MTM-UAS exam, a certificate is issued. In case of failure, this will be reported in a separate letter and a neutral certificate will be issued instead of the certificate.

Application practice

Ideally, after the successful completion of the second MTM process module system, MTM practitioners will be followed by several months of application practice before participating in the following training.



MTM-Practitioner

The training MTM practitioner can be carried out as public or company-internal training or as “coaching on the job” to be completed by participants.

Admission requirements

Participation in the MTM Practitioner training requires the MTM-1 certificate and the certificate of one of the following training courses: MTM-SD, MTM-2, MTM-UAS, MTM-MEK or the recognized company process block systems. Admission Requirements for the MTM practitioner training are required to gain practical experience after completing their training in the respective MTM process block system.

Subject

The MTM Practitioner training imparts knowledge and practice-oriented skills for the application of the MTM process blocks for the planning and design of existing and future business processes and work systems.

Content

The participant:

- performs at least one actual-target comparison. It is important to pay attention to a scope of analysis that meets the respective task or the scope of analysis of the respective process block system,
- identifies analysis errors or deviations from (operational) reality and presents potential for improvement in a suitable form,
- develops, documents and implements meaningful work organizational / design measures for a specific practical task; for example, in the considered work system or on the product under consideration by using the design checklist and the action sheet,
- carries out a profitability comparison in a suitable and correct form,
- documents and presents the results obtained in an appropriate form.

Learning goals

The participant will know:

- the individual phases in the product development process and the holistic design approach of MTM,
- methods and tools that can be used to design and optimize work systems.

The participant can apply the MTM procedure in practice, in particular to:

- planning new workflows and work systems and improving existing work systems,
- selection and evaluation of design solutions according to ergonomic and economic criteria.

Training duration

The duration of MTM practitioner training is 40 hours.

Examination and Evaluation

The training MTM practitioner (in all three variants) concludes with a presentation of the project results and an exam. In exceptional cases, an additional oral examination may be required by the examination board.

Certificate

After passing the MTM practitioner exam, a certificate will be issued. In case of failure of the MTM Practitioner Examination, this will be communicated in a separate letter and a neutral certificate will be issued instead of the certificate.

Qualification as MTM-practitioner

Productive and healthy
work design



The qualification “MTM-practitioner” starts with a training in MTM-1, subsequently followed by a training in at least one second MTM process building system – for example MTM-UAS (Universal Analyzing System). Based on this the MTM-practitioner training concentrates on product and process design in practical application.

Organization

Organization:	MTM-UAS
Duration:	5 days classroom training
Venue:	At the various ITESM campuses in nearly every Federal State of Mexico. We also offer this training as an internal course within your company.
Course fee:	Public training € 1.250.- per person
(plus taxes)	For an internal training, an individual offer will be submitted. All the working materials and refreshments are included in the fee.

The training is carried out in cooperation with the Mexican MTM ASSOCIATION.

Registration

We recommend the easy and fast online registration (<https://e-mas.de/course-registration/?lang=en>), alternatively and for more information, you can contact us on our website (<https://e-mas.de/contact/?lang=en>). A reservation by telephone is also possible. The terms and conditions of the German MTM-Association apply (<https://www.dmtm.com/agb/seite15/>).

Contents

The training MTM-UAS conveys knowledge of the content and structures of the MTM-UAS process building block system, consisting of the MTM-UAS basic operations and the MTM-UAS standard operations for Batch Production and trains the skills required for its practical application.

- The process building block system MTM-UAS and its development.
- Principles of the development as well as knowledge of the structures and content of the MTM-UAS basic operations and the MTM-UAS standard operations.
- The rules for the consistent and correct use of the process building block system MTM-UAS.
- Practical exercises to consolidate the gained knowledge.
- The training MTM-UAS ends with a written exam.

Course Instructor / Contact

Organzier

The MTM, based in Hamburg, was founded in 1962 as a non-profit, scientific-technical association. It has more than 500 members, of which approximately 250 corporate members represent around 2.75 million employees in Germany. The special expertise of the MTM is productivity management in industry, service and administration. Hereby the main objective is to optimally combine efficiency and ergonomics in work processes. In the field of industrial engineering, the scientific methods and tools of the MTM are among the most important international standards in the automotive industry. In the German automotive sector itself, the MTM awards approx. 2,000 certificates annually to participants for their continuing education offers.



Contact

ao. Univ.-Prof. Dipl.-Ing. Dr. techn. Peter Kuhlang
Head of MTM Institute, Technical Director International MTM Directorate

Peter Kuhlang completed his habilitation in June 2013 at the Vienna University of Technology for the subject “Business Administration / Industrial Engineering“ and in the same year became associate professor at the Vienna University of Technology.

In April 2014, he was appointed head of the MTM Institute of the MTM ASSOCIATION. From December 2014 to January 2017, Peter Kuhlang was head of the MTM Academy of the MTM. Currently, Peter Kuhlang is a member of the MTM Board of Directors as well as the Executive Board of the International MTM Directorate. As Technical Director, he coordinates worldwide MTM developments.

MTM ASSOCIATION e. V.

Elbchaussee 352
22609 Hamburg
Germany
Phone: +49 40 822779-0
E-Mail: Peter.Kuhlang@dmtn.com
www.dmtm.com

If you have any questions or suggestions regarding the E-Mas training program or the MTM practitioner, we look forward to hearing from you!

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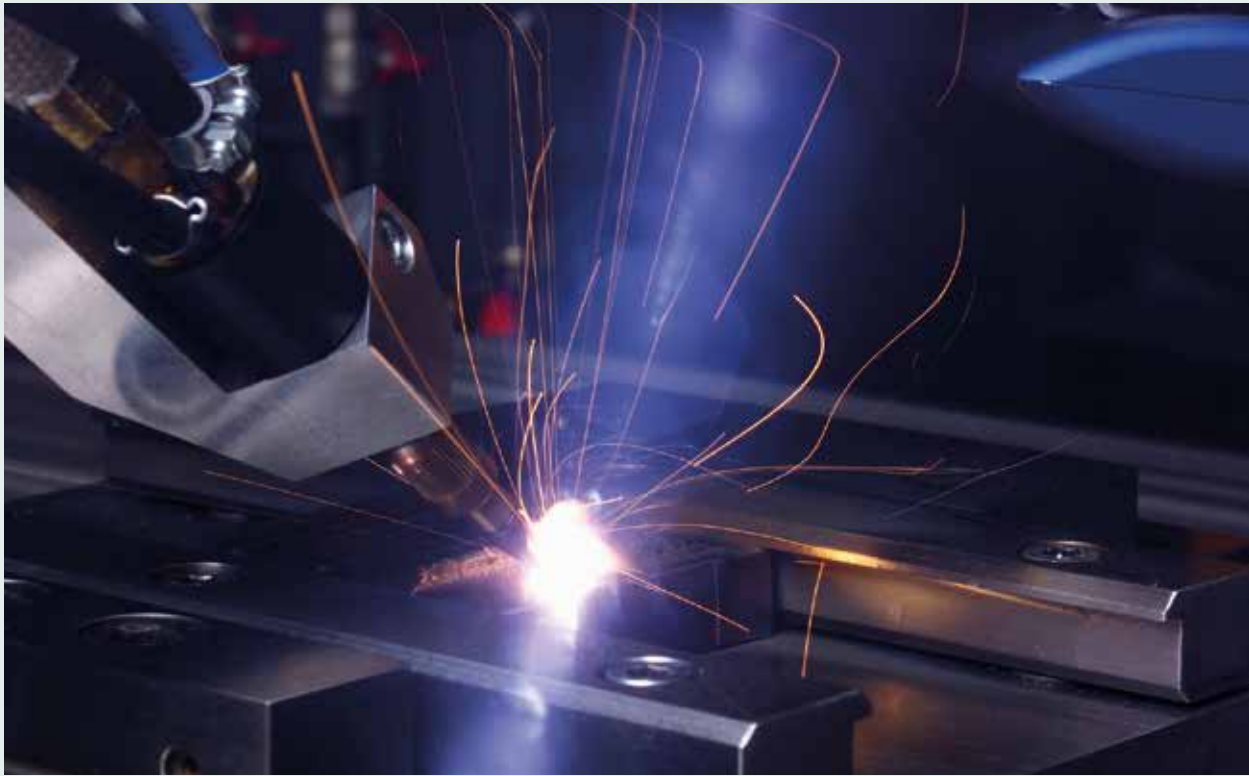
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Projektträger im DLR

www.e-mas.de
www.e-mas.mx

Certificate course



**WBA
WERKZEUGBAU
AKADEMIE**



Expert Industrial Tool and Die Making

Technologies and strategies
for a sustainable tool and die making



Overview of the certificate course



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.





Course 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 skills to be acquired:

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.

Organization



**WBA
WERKZEUGBAU
AKADEMIE**

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, Hirsch-

vogel, 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”



Manufacturing technologies

In 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.

- **Conventional manufacturing processes**

This 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.

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

The 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.

- **Forming of plastics**

In this topic area, 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.



Design theory/ Materials and surface technology

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.

- **Materials**

The 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.

- **Methods for surface technology**

The 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.

- **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 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”



Repair and service/Maintenance

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

- **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.

- **Industrial services and their optimization**

The 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.

- **Service Engineering**

The 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 cost.



Process and project management/ Work organization

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.

- **Process and project management**

In this 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.

- **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.

- **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.

CAD-CAM-NC-Chain and Automation/ Simulation

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.

- **Automation of plants and machines**

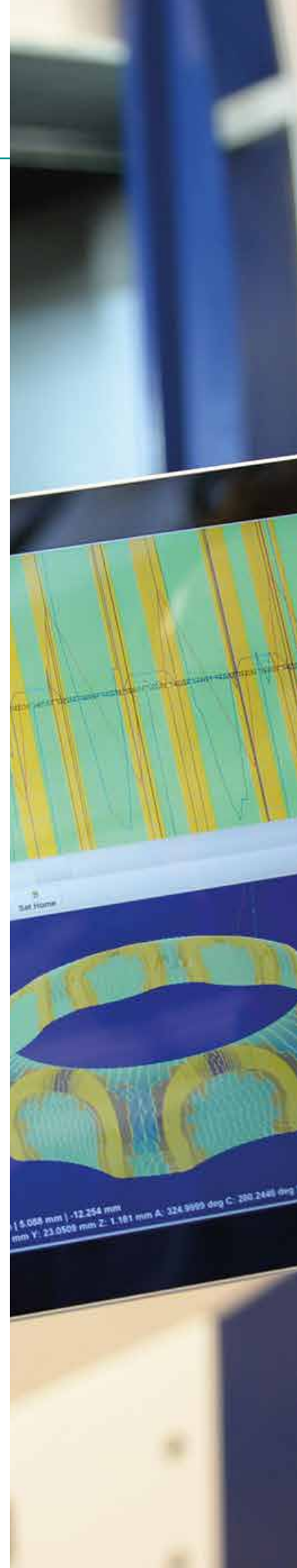
Automation refers to all measures for completely or partially autonomous operation of processes that are automatically controlled according to a previously created program without human intervention. This requires mechanization and control technology. The aim of the topic is to give the participants 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.

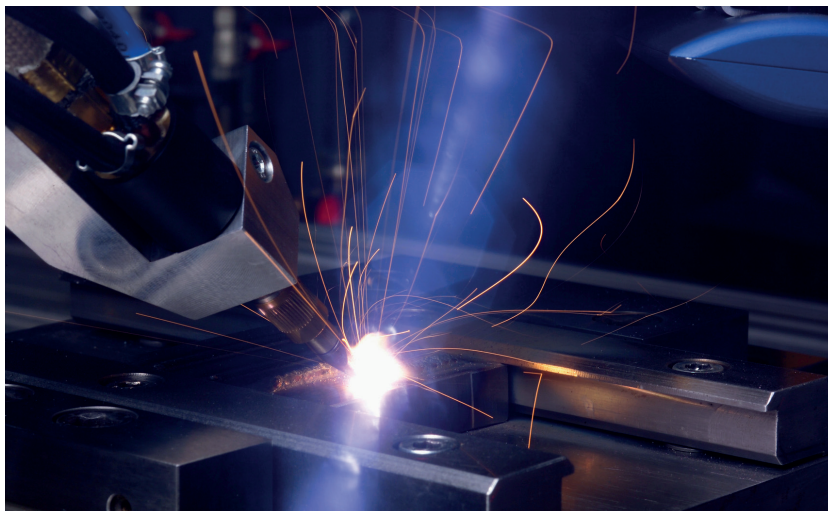
- **CAD/ CAM with various PLM, CAD and CAM systems**

In this 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.

- **Simulation**

The 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.





Certificate course

Expert Industrial Tool and Die Making

Technologies and strategies for a sustainable tool and die making

► Organisation

Duration of the course:	3 courses of 5 days each classroom training
Course location:	Three successive courses will take place at Centro de Vinculación Tecnológica (CVT) de CAINTRA NL. Av. Alianza Centro 505, Parque de Investigación e Innovación Tecnológica, Apodaca, N.L. We also offer the course in-house in your company.
Course fee (plus tax):	1.650 € per person per course
Special fee (plus tax):	4.350 € per person for the 3 courses 1.450 € per person per course, when booking min. 5 persons 3.950 € per person for the 3 courses, when booking min. 5 persons 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 (<https://e-mas.de/course-registration/?lang=en>), alternatively for more information; you can contact us on the website (<https://e-mas.de/contact/?lang=en>). You can also contact our local partner KIT Hub, Germán Bonilla Bermúdez (german@kithub.mx, tel. +52 1 462 164 3239) for your registration. 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 FIR 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.



Program* Course 1: Introductory Seminar for Expert Industrial Tool and Die Making

Technologies and strategies for the future of the toolmaking sector

Monday, 25 th of November 2019: Basics of tools	Tuesday 26 th of November 2019: Trends of tools and standardization	Wednesday 27 th of November 2019: Tool Manufacturing
<p>08:30 – 09:00 Welcome</p> <p>09:00 – 10:30 Basics of Tools</p> <p>10:30 <i>Coffee break</i></p> <p>10:45 – 12:15 Tool Types</p> <p>12:15 <i>Lunch</i></p> <p>13:15 – 14:45 Workshop: Discussion about Participant's Tools</p> <p>14:45 <i>Coffee break</i></p> <p>15:00 – 16:30 Tooling Materials</p> <p>16:30 – 17:00 Review of the Day</p>	<p>08:30 – 09:00 Welcome</p> <p>09:00 – 10:30 Trends in Tooling</p> <p>10:30 <i>Coffee break</i></p> <p>10:45 – 12:15 Standardization in Tooling</p> <p>12:15 <i>Lunch</i></p> <p>13:15 – 14:45 Workshop: Standardization Possibilities at Participant's Tools</p> <p>14:45 <i>Coffee break</i></p> <p>15:00 – 16:30 Process Chain of Tool Manufacturing</p> <p>16:30 – 17:00 Review of the Day</p>	<p>08:30 – 09:00 Welcome</p> <p>09:00 – 10:30 Milling Technology I</p> <p>10:30 <i>Coffee break</i></p> <p>10:45 – 12:15 Milling Technology II and Discussion about Best Practice</p> <p>12:15 <i>Lunch</i></p> <p>13:15 – 14:45 EDM I</p> <p>14:45 <i>Coffee break</i></p> <p>15:00 – 16:30 EDM II and Discussion about Best Practice</p> <p>16:30 – 17:00 Review of the Day</p>
Thursday 28 th of November 2019: Tool Manufacturing and Wear	Friday 29 th of November 2019: Exam	
<p>08:30 – 09:00 Welcome</p> <p>09:00 – 10:30 Grinding and Polishing Technology I</p> <p>10:30 <i>Coffee break</i></p> <p>10:45 – 12:15 Grinding and Polishing Technology II and Discussion about Best Practice</p> <p>12:15 <i>Lunch</i></p> <p>13:15 – 14:45 Application Characteristics of Tools</p> <p>14:45 <i>Coffee break</i></p> <p>15:00 – 16:30 Wear Mechanism and Protection</p> <p>16:30 – 17:00 Review of the Day</p>	<p>08:30 – 09:00 Welcome</p> <p>09:00 – 10:30 Wrap-up</p> <p>10:30 <i>Coffee break</i></p> <p>10:45 – 12:15 Personal Study Time</p> <p>12:15 <i>Lunch</i></p> <p>13:15 – 14:45 Exam</p> <p>14:45 <i>Coffee break</i></p> <p>15:00 – 16:30 Trends in Manufacturing</p> <p>16:30 – 17:00 Review of the Day and Farewell</p>	

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



Program* Course 2: Practical Seminar CAD/CAM

Technologies and strategies for the future of the toolmaking sector

Monday, 27 th of January 2020: CAD	Tuesday, 28 th of January 2020: CAD	Wednesday, 29 th of January 2020: CAM
<p>08:30 – 09:00 Welcome</p> <p>09:00 – 10:30 Basic Design Concepts</p> <p>10:30 <i>Coffee break</i></p> <p>10:45 – 12:15 Analyze and Validate Geometry</p> <p>12:15 <i>Lunch</i></p> <p>13:15 – 14:45 Tooling and Die Design</p> <p>14:45 <i>Coffee break</i></p> <p>15:00 – 16:30 Tooling and Die Design</p> <p>16:30 – 17:00 Review of the Day</p>	<p>08:30 – 09:00 Welcome</p> <p>09:00 – 10:30 Tooling and Die Design</p> <p>10:30 <i>Coffee break</i></p> <p>10:45 – 12:15 Working with Surfaces</p> <p>12:15 <i>Lunch</i></p> <p>13:15 – 14:45 Assembly design context</p> <p>14:45 <i>Coffee break</i></p> <p>15:00 – 16:30 Drawing Process</p> <p>16:30 – 17:00 Review of the Day</p>	<p>08:30 – 09:00 Welcome</p> <p>09:00 – 10:30 Basic manufacturing concepts I</p> <p>10:30 <i>Coffee break</i></p> <p>10:45 – 12:15 Basic manufacturing concepts II</p> <p>12:15 <i>Lunch</i></p> <p>13:15 – 14:45 Coordinate Systems</p> <p>14:45 <i>Coffee break</i></p> <p>15:00 – 16:30 Milling Operations</p> <p>16:30 – 17:00 Review of the Day</p>
Thursday, 30 th of January 2020: CAM	Friday, 31 st of January 2020: CAM	
<p>08:30 – 09:00 Welcome</p> <p>09:00 – 10:30 Milling Operations I</p> <p>10:30 <i>Coffee break</i></p> <p>10:45 – 12:15 Drilling Operations</p> <p>12:15 <i>Lunch</i></p> <p>13:15 – 14:45 WEDM Operations</p> <p>14:45 <i>Coffee break</i></p> <p>15:00 – 16:30 Engrave Text</p> <p>16:30 – 17:00 Review of the Day</p>	<p>08:30 – 09:00 Welcome</p> <p>09:00 – 10:30 Planar Milling</p> <p>10:30 <i>Coffee break</i></p> <p>10:45 – 12:15 3-Axis contouring</p> <p>12:15 <i>Lunch</i></p> <p>13:15 – 14:45 5-Axis contouring</p> <p>14:45 <i>Coffee break</i></p> <p>15:00 – 16:30 Validation & Simulation</p> <p>16:30 – 17:00 Review of the Day and Farewell</p>	

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



Program* Course 3: Repair and Maintenance

Technologies and strategies for the future of the toolmaking sector

Monday, 24 th of February 2020: Materials and Wear	Tuesday, 25 th of February 2020: Wear and Repair	Wednesday, 26 th of February 2020: Wear and Repair
<p>08:30 – 09:00 Welcome</p> <p>09:00 – 10:30 Basic of Tools</p> <p>10:30 <i>Coffee break</i></p> <p>10:45 – 12:15 Materials</p> <p>12:15 <i>Lunch</i></p> <p>13:15 – 14:45 Wear characteristics</p> <p>14:45 <i>Coffee break</i></p> <p>15:00 – 16:30 Wear characteristics</p> <p>16:30 – 17:00 Review of the Day</p>	<p>08:30 – 09:00 Welcome</p> <p>09:00 – 10:30 Wear mechanisms</p> <p>10:30 <i>Coffee break</i></p> <p>10:45 – 12:15 Wear mechanisms</p> <p>12:15 <i>Lunch</i></p> <p>13:15 – 14:45 Basics of repair</p> <p>14:45 <i>Coffee break</i></p> <p>15:00 – 16:30 Basics of repair</p> <p>16:30 – 17:00 Review of the Day</p>	<p>08:30 – 09:00 Welcome</p> <p>09:00 – 10:30 Process of Repair</p> <p>10:30 <i>Coffee break</i></p> <p>10:45 – 12:15 Process of Repair</p> <p>12:15 <i>Lunch</i></p> <p>13:15 – 14:45 Wear Protection</p> <p>14:45 <i>Coffee break</i></p> <p>15:00 – 16:30 Wear Protection</p> <p>16:30 – 17:00 Review of the Day</p>
Thursday, 27 th of February 2020: Maintenance	Friday, 28 th of February 2020: Exam	
<p>08:30 – 09:00 Welcome</p> <p>09:00 – 10:30 Maintenance</p> <p>10:30 <i>Coffee break</i></p> <p>10:45 – 12:15 Maintenance</p> <p>12:15 <i>Lunch</i></p> <p>13:15 – 14:45 Maintenance</p> <p>14:45 <i>Coffee break</i></p> <p>15:00 – 16:30 Maintenance</p> <p>16:30 – 17:00 Review of the Day</p>	<p>08:30 – 09:00 Welcome</p> <p>09:00 – 12:15 Exam</p> <p>12:15 <i>Lunch</i></p> <p>13:15 – 14:45 Outlook</p> <p>14:45 <i>Coffee break</i></p> <p>15:00 – 16:30 Outlook</p> <p>16:30 – 17:00 Review of the Day and Farewell</p>	

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

Course instructor / Contact



Carmen Halm
WBA Aachener Werkzeugbau Akademie GmbH
Campus-Boulevard 30
52074 Aachen · Germany
Phone: +49 241 99016-316
E-Mail: c.halm@werkzeugbau-akademie.de
www.werkzeugbau-akademie.de

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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www.e-mas.de
www.e-mas.mx

Certificate course



Lean Management 4.0 Production Expert

Implementing Lean Production Management
in the digital transformation process

Overview of the certificate course

▶ What we offer:

The certificate course offers extensive expertise to understand and apply, within the work process, through the use of Lean methods in the design of workflows using potential from innovative Industrie 4.0 environments in production. Lean Thinking can demonstrably improve competitiveness in conjunction with increasing employee skills. The LEI certificate course counteracts the shortage of skilled workers and the resulting turnover in Mexico. Moreover, it leads to a sustained increase in efficiency and lead-time in companies. In this course, the actors are empowered to tap potentials and implement them through targeted lean measures based on the five basic principles of lean strategy: customer value, value stream, flowing processes, pull and perfection.

▶ Target group:

Specialist and operational executives entrusted with the implementation of organizational change processes in the areas of production, administration, maintenance and development.





Course objective:

The Lean Enterprise Institute certificate course Lean Management 4.0 Production Expert deals with the program module „Integrate Lean Principles in the Process of Digital Transformation“ as part of the E-Mas continuing education offer for operative production management. By means of this course, participants will be enabled to implement design principles in an innovative and solution-oriented manner in accordance with the lean strategy through employee participation. High acceptance of the concepts is specifically promoted. The participants learn u. a. How to sustainably support your colleagues on the way to successful lean management in Industry 4.0. They learn how to design Lean principles in their work environment so that the principles of Lean-Pull-Pull-zeros can be achieved. The various didactic methods of mediation, augmented by the building blocks of blended learning, are at your disposal. It provides a hands-on overview of how the principles of lean management in the diversity of companies act as a successful planning system in the implementation of change as guard rails and enable directional organizational development. Through the certificate course, participants acquire application knowledge about the task-appropriate selection of methods and their application for Lean Production. They will be qualified to adapt the learned measures to their business environment and to implement them in teams after the successful completion of the course.



Key skills to be acquired:

After completion of the course the participant will be successfully able to:

- Initiate change processes in the company and supervise their implementation,
- Recognize wastefulness and actively avoid and eliminate it,
- Actively convey Lean Methods to the employees, put them into practice and develop them together,
- Know important organizational differences between the automobile industry in Germany and Mexico and consider this knowledge in their change processes,
- Moderate a continuous improvement process in the company,
- Identify critical success factors and key indicators and visualize their development in the context of a regular shopfloor management with regard to their impact on processes,
- Recognize potentials and challenges in cooperation and create synergies.



Certificate and Examination modalities:

The qualification in Lean Management 4.0 Production Expert is designed as a certificate course. Successful participation and approval of the examination is evidenced by a certificate with a detailed description of the course content. A repetition of the test in case of failure is possible.



Course concept:

Face-to-face courses are combined with digital media to enable trainers to hold conversations in a teaching environment in real and digital classrooms. Appropriate teaching concepts, such as interactive workshops, webinars and live streams of business games as well as a media library should enable participants direct problem-oriented to learn and independent self-study the topics. The exact combination of analogue and digital teaching and learning methods is designed and aligned according to the needs of the respective companies and the individual requirements of the actors.

Organization



The certificate course Lean Management 4.0 Produktion Expert is an exclusive offer for Mexican companies provided by the Lean Enterprise Institute (LEI) in cooperation with the Instituto Tecnológico y de Estudios Superiores de Monterrey (ITESM).

LEI has more than 30 years of experience and it is an institute operating internationally in association with partner organizations with around 50 employees. LEI was founded in 2010 from a group of companies at RWTH Aachen University. We offer lean qualification in the fields of innovation, production, administration and maintenance and support our partners in sustainable implementation. The bundle of experience that we have gained and acquired over the years in cooperation with renowned partners flows into the course we offer for targeted further training in the Mexican automotive sector.



Module overview “Lean Management 4.0 Production Expert”



Module 1 Lean Production

Lean production refers to the implementation of lean management principles in the respective production process. It is shown which structures exist or should be introduced to correspond to the basic idea of lean thinking. Lean implementation is not only limited to the productive areas, but also includes the interfaces to administrative order processing.

- **Topic 1: Fundamentals of Lean Enterprise**

For decades, Lean Management has proven to be an efficient and successful concept not only for manufacturing companies, but also for other industries. Starting with production companies, the lean production approach based on the Toyota principle has established itself. The successful application at Toyota, which is explained and clarified with regard to the underlying lean principles, is fundamental here. Their company-related implementation is questioned and the framework conditions of their application are described. Exercises and field reports complement this part.

Production refers to the realization of the Lean Management principles in production. Customer orientation and continuous improvement with economic and efficient processes can be achieved through transparency concerning availability, quality and individuality of the service. This holds true for almost all industries, but especially for the automotive industry. The design of efficient structures and processes using lean principles can be achieved in harmony with productivity and employee satisfaction. In this topic area, the fundamental interrelationships between the lean concept and the lean production principles are presented, starting with the development of technical operations management. Using examples, the effect of lean tools will be explained with appropriate measures and ways to introduce them will be presented. Furthermore, the determination of the Lean maturity level and the role of leadership in a Lean company will be discussed. By means of descriptive practical examples the procedure is clarified and possible undesirable developments are avoided.

- **Topic 2: Application of Lean Methods**

In line with the five basic principles of Lean, customer benefit, value stream, flow principle, pull control and perfection (Zero Defect), Lean consistently pursues the goal of creating value without waste.

The use of tried and tested lean methods and tools for implementing lean processes in the company requires a basic understanding among the employees concerned. Knowledge about the effect of Lean Tools and their application are components of success. Employees must understand and be able to comprehend the benefits of these tools. Essential methods and tools are explained in their interaction.

The build-up and development of lean competencies among employees are essential. Sustainable acceptance requires the setting of clear and transparent goals that are comprehensibly relevant and as measurable as possible. In practical method training courses, exemplary success experiences will be conveyed which help to ensure acceptance.

Important Lean Methods include:

- The 5S/6S method for order and cleanliness,
- Value stream analysis and value stream design (Value Stream Mapping),
- The standardization of work methods (Standardized Work),
- Working in customer contact,
- A change towards the Pull System (Kanban) and supermarket,
- The creation of a fluent material flow (Work in Process).

Method 6S (5S) is presented and explained as a system for order and cleanliness. The 6S and 5S levels are explained exemplarily and illustrated with examples. An understanding for the topic and the necessary exchange of information is developed in teams.

Module overview “Lean Management 4.0 Production Expert”

The method Value Stream Design, as one of the most important methods for Lean Production, is introduced by means of examples. The description concept and the established symbolism are to be applied.

This requires the provision of appropriate human and financial resources, which remain stable even in the event of organizational changes. Theoretical learning discussions are combined with practical exercises and realistic business games. The interactive dialogue between the learning groups is also important in order to exchange insights and jointly develop synergies and solutions.

- **Topic 3: Sustainability and competences for Lean Production**

Critical success factors such as framework conditions, problems and possible solutions are highlighted. The prerequisites for the introduction and for a stable sustainability are explained. Knowledge about Lean Tools and their application are building blocks of success. Employees must be able to recognize and understand their benefits. In this topic area, essential methods are taught in their interaction.

Critical success factors for stable sustainability are presented. The findings are based on comparative studies in which the companies explained concrete implementation experiences and their effects. Examples of good practice for implementation processes are discussed. Principles and experiences of shop floor management are presented.

In a certificate examination, the acquired competences are tested using competence-oriented multiple-choice questions and a certificate is issued upon successful completion.

Learning goals: The graduates will know the requirements for the sustainability of lean production and have the knowledge about its application. They will understand the needs and will be able to explain them. They will know critical success factors that influence the sustainability of the introduction of lean production.



Module 2 Excellent Lean Management

Lean Management 4.0 is the synergetic interaction of lean principles in the environment of Industry 4.0. Lean Management 4.0 extends the benefits of cyberphysical systems based on the lean thinking concept. Intelligent networking now enables communication and information provision based on real-time data provided in digital service platforms for specific tasks. The classic separation between production and service is increasingly mixed from the customer's point of view, and products are also becoming digital information carriers.

- **Topic 1: Leadership methods and standards**

The success of Lean Management can be measured rather in the medium term, which means that a basic conviction of success as a strategic position must be present among managers from the very beginning. In this topic area, we will point out which demands managers must meet in the Lean environment and how they must be prepared for this.

The design of leadership within the company is a critical success factor for the implementation and acceptance of lean management. An appropriate leadership span is just as important as the selection of the right executives. This applies not only to the management level, but to all levels up to the shop floor. It is not enough just to want lean; managers must see themselves as coaches for their employees and actively want and live the lean culture. Lean management sees employees as the greatest asset. They are also the focus of implementation in Lean Enterprise.

Critical success factors such as framework conditions, problems and possible solutions are clarified. Prerequisites for the introduction of lean in production and for accepted sustainability are presented. Knowledge about the effect of lean tools and their application are building blocks of success. Employees must be able to recognize and understand their benefits. In this topic area, the essential fundamentals are explained in their interaction. Furthermore, the determination of the Lean maturity level and the role of management in a Lean company will be discussed. By means of clear practical examples, the procedure is clarified and possible undesirable developments are avoided.

The methods for the analysis of the respective value creation process and the associated key figures are presented and interpreted.

- **Topic 2: Digital transformation process and roadmap**

The interaction of lean principles in the environment of an Industrie 4.0 will be discussed. Lean Management 4.0 extends the benefits of cyber physical systems based on the Lean Thinking concept. Intelligent networking now enables communication and the provision of information based on real-time data, which is made available in digital service platforms for specific tasks.

The classic separation between production and service is increasingly blurring for the customer and products are turning into digital information carriers. The use of these data sources requires close coordination between customers and suppliers in order to guarantee the greatest possible data and system security.

The increasing digitalization and networking within companies enables a remarkable increase in the efficiency of value creation. The process of digital transformation is driven by the agile development of IT infrastructures and accompanied by a change in engineering. Existing competences in the companies must be adapted, supplemented and developed by further training. Digital factories with a future need employees with new competence profiles. The production process with assigned administration and development is assisted by digital twins with up-to-date analysis data.

Man and machine interact and increasingly collaborate. Digital control systems offer user-friendly assistance systems for programming and machine control. They simulate production processes with foresight. Customers are involved in the order progress.

Integrated into holistic production systems, task-appropriate and personalized information systems can be configured in such a way that coordinated decentralized access to production data is possible on a short-cycle basis, including central order data.

Learning goals: Graduates of this learning unit will understand the concept of Lean Leadership, recognize the importance of the necessary change process and discern ways to a Lean Enterprise of their company. They will know the importance of digital transformation in companies and will be in a position to initiate projects to this end.





Certificate Course

Lean Management 4.0 Production Expert

Integral implementation of lean in the
digital transformation process



Organization

Course duration:	5 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 (€ 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 a customized quotation. An in-house course requires a minimum of 12 participants.



Registration

We recommend a simple and quick online registration (<https://e-mas.de/course-registration/?lang=en>). Alternatively and for more information; you can contact us on our website: <https://e-mas.de/contact/?lang=en>. A reservation by telephone is also possible. If we do not receive the written registration within four weeks after the reservation by telephone, 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 FIR 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.



Course Itinerary*

Lean Management 4.0 Production Expert

Integral implementation of lean in the digital transformation process

Day 1: Module 1 Lean Production	Day 2: Module 1 Lean Production	Day 3: Module 2 Excellent Lean Management
Fundamentals of Lean Enterprise 09:00 – 09:30 Welcome 09:30 – 11:00 Introduction to Lean Enterprise <i>11:00 Coffee break</i> 11:15 – 12:45 Lean Production Basics <i>12:45 Lunch</i> 13:45 – 15:15 The 6S method: introduction, simulation game and implementation <i>15:15 Coffee break</i> 15:45 – 17:15 Value Stream Method – Design and Analysis 19:00 – 22:00 Dinner	Application of Lean Methods 09:00 – 11:00 Practical example: Value Stream Analysis and Design – current process <i>11:00 Coffee break</i> 11:15 – 12:45 Practical example: Value Stream Analysis and Design – target process <i>12:45 Lunch</i> 13:45 – 15:45 Production Management – selected methods <i>15:45 Coffee break</i> 16:15 – 17:45 Optimization of setup processes – SMED	Leadership methods and standards 09:00 – 11:00 Lean Leadership – Kaizen <i>11:00 Coffee break</i> 11:15 – 12:45 Lean Audits and Maturity Level <i>12:45 Lunch</i> 13:45 – 15:45 Shopfloor Management <i>15:45 Coffee break</i> 16:15 – 17:45 Value stream oriented production planning
Day 4: Module 2 Excellent Lean Management	Day 5: Module 1 and Examination Lean Production	
Digital transformation process and roadmap 09:00 – 11:00 Data analysis in production – potentials of real-time data <i>11:00 Coffee break</i> 11:15 – 12:45 Examples of application from companies <i>12:45 Lunch</i> 13:45 – 15:45 Learning project for the development of a lean roadmap <i>15:45 Coffee break</i> 16:15 – 18:15 Conceptualization and presentation of Lean Innovation 19:00 – 22:00 Exclusive evening event	Sustainability and competences for Lean Production 09:00 – 11:00 Establishing sustainability of Lean Management 4.0 <i>11:00 Coffee break</i> 11:15 – 12:45 Written Exam <i>12:45 Lunch</i> 13:45 – 15:15 Summary and farewell	

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

Course instructor / Contact



Dr.-Ing. Gerd Conrads
Lean Enterprise Institut GmbH
Campus-Boulevard 57 · 52074 Aachen · Germany
Phone: +49 241 51031-404
Mobile: +49 151 180 459 35
E-Mail: gerd.conrads@lean-enterprise-institut.com
www.lean-enterprise-institut.com

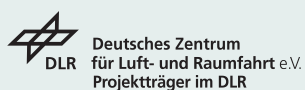
Dr.-Ing. Gerd Conrads graduated from the University of Applied Sciences Cologne and RWTH Aachen University with a degree in automotive engineering. Subsequently, he worked as sub-project manager in power plant construction. He then returned to RWTH Aachen University, where he worked at the Institute of Industrial Engineering and also obtained his doctorate. He then worked as a sector consultant, association engineer, managing director and trainer in industrial engineering and lean management for recognized institutions before taking up his current position as senior trainer at the Lean Enterprise Institut (LEI) at RWTH Aachen Campus. Within the scope of his work at LEI, Dr. Conrads has helped to build up the qualification field 'Lean' in work organization in the digital transformation process and has worked in various projects, including in the automotive sector, on the sustainable implementation of a more efficient and effective work organization in companies.

If you have any questions or suggestions about the E-Mas training program or the LEI certificate course "Lean Management 4.0 Expert", we look forward to hearing from you!

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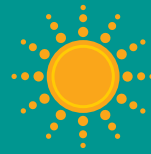


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Contact Persons



Institute for Industrial Management at
RWTH Aachen University (FIR)
Drs. Roman Senderek
Campus-Boulevard 55
52074 Aachen, Germany
Telephone: +49 241 47705-225
E-Mail: Roman.Senderek@fir.rwth-aachen.de
www.fir.rwth-aachen.de



MTM Association e. V. (MTM)
Prof. Dr. Peter Kuhlant
Elbchaussee 352
22609 Hamburg, Germany
Telephone: +49 40 822779-0
E-Mail: peter.kuhlant@dmmt.com
www.dmtm.com



WBA Aachener Werkzeugbau
Akademie GmbH (WBA)
Carmen Halm
Campus-Boulevard 30
52074 Aachen, Germany
Telephone: +49 241 99016 316
E-Mail: c.halm@werkzeugbau-akademie.de
www.werkzeugbau-akademie.de



Lean Enterprise Institut GmbH
(LEI)
Dr. Gerd Conrads
Campus-Boulevard 57
52074 Aachen, Germany
Telephone: +49 241 51031 404
E-Mail: gerd.conrads@lean-enterprise-institut.com
www.lean-enterprise-institut.com

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