

Engineering the German Way

Engineering the German Way (EGW) is a 4.5-week Summer School in Munich at the University of Applied Sciences. It offers an in-depth study of engineering and cultural business topics with a focus on „The German Way“.

The participants of EGW will get an insight into several best practice companies and learn about their successful methods at first hand (see selected levels for engineering excellence at work, and discuss company-specific topics with the managers in charge).

To get the most value out of the summer school, we provide a combination of two courses:

Program Overview – 6 Credits in 4.5 weeks			
Course GET: German Engineering Framework		Course GEC: German Engineering Culture	
Academic Modules	Extension	Hours	
<ul style="list-style-type: none"> ▪ Global German Production Footprint ▪ The Digital Factory ▪ Service Engineering in Germany (modeling frameworks & perform. metrics) ▪ Ergonomics in a German production environment ▪ Engineering Law in German Enterprises 	<ul style="list-style-type: none"> Fact.Tour Fact.Tour Fact.Tour 	<ul style="list-style-type: none"> 12,5 11 9,5 12,5 5 	50,5
Social and Cultural Program			
<ul style="list-style-type: none"> ▪ Group airport pickup and drop-off ▪ Welcome dinner ▪ Team building event ▪ 3-4 Events (Touring Upper Bavaria, Concentration Camp, Lake Tegernsee, ...) 			
17 calendar days			
&			
<ul style="list-style-type: none"> ▪ The German workforce ▪ German workplace culture ▪ Engineering in a foreign country - survive in discussions! ▪ R&D Management in a German context ▪ Case Study Competition ▪ Entrepreneurs for industrial services 	<ul style="list-style-type: none"> Fact.Tour 	<ul style="list-style-type: none"> 5 6 4 12,5 10 10 	47,5
Social and Cultural Program			
<ul style="list-style-type: none"> ▪ 3-4 Events (City Tour of Traditional Munich, Cooking Event, Brewery Tour, Salzburg City Tour, ...) ▪ Farewell Dinner 			
17 calendar days			

German Engineering Culture

Course 2: **German Engineering Culture**: The world becomes more and more globalized. Companies are working in an environment of international competition. However, how to prepare for an international career in the engineering field? Which influences have cultural aspects and what are success factors? What is the difference in other countries?

Course GEC: German Engineering Culture		
Academic Modules	Extension	Hours
<ul style="list-style-type: none"> ■ The German workforce ■ German workplace culture ■ Engineering in a foreign country - survive in discussions! 		5 6 4
<ul style="list-style-type: none"> ■ R&D Management in a German context ■ Case Study Competition ■ Entrepreneurs for industrial services 	Fact.Tour	12,5
		47,5
Social and Cultural Program		
<ul style="list-style-type: none"> ■ 3-4 Events (City Tour of Traditional Munich, Cooking Event, Brewery Tour, Salzburg City Tour, ...) ■ Farewell Dinner 		
17 calendar days		

The course includes models and methods to analyze and use cultural aspects, explains historical developments in Germany, if needed, and gives the students the opportunity to apply their knowledge and solve real engineering tasks. The Students will be supervised and supported by experienced international managers while they are working together in teams. Special focus is given to Engineering Culture in Germany and working abroad.

The course has **47.5 contacts hours** (including labs, which count 50%) and a factory tour. The students will be graded by their presentation, the outcome of the group work, written exam tasks and they will receive personal feedback on their work.

Program and Module Description EGW

Module name: *The German workforce*

- **Credits and Contact Hours:** 5 contact hours
- **Instructor:** Prof. Dr. Wolfgang Döhl
- **Textbook: none**

Supplemental materials: Extensive instructor's notes/handouts/overheads

- **Specific Module Information:**

This module provides an overview of the specific way of cooperation and co-determination in German industry based on the German history of the last few decades. The students will learn about the organizational structure of labor unions and employers' associations in Germany. They will come to know how negotiations on wages and working conditions will take place and how to start and settle a legal strike.

Prerequisites: none

- **Specific Goals for the Module:**

- To provide an understanding of the German approach of cooperation
- To teach the fundamental concepts of codetermination in Germany
- To provide an understanding of the long-term approach in employing people in Germany

- **Applicable ABET Outcomes:**

After having successfully finished this module, the students will have:

- (a) an ability to identify the specific background of the employment policy in Germany
- (b) an ability to avoid pitfalls in employing and dismissing staff in Germany
- (c) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context

- **Topics covered:** Organization of labor unions and employer's associations in Germany. "One company – one labor union" as a key issue. Efficiency in negotiating wages and labor conditions. Necessary steps to start a legal strike. Why strikes are rare in Germany. Co-determination as a success factor in Germany.

Program and Module Description EGW

Module name: *German workplace culture*

- **Credits and Contact Hours:** 6 contact hours
- **Instructor:** Prof. Dr. Mathias Gabrysch
- **Textbook: none**

Supplemental materials: Extensive instructor's notes/handouts/overheads

- **Specific Module Information:**

There is a special culture at German workplaces, which is a little different from that of an American workplace. An inside look on how Germans work helps to understand culture as a success factor for business and to be better prepared for a potential internship or career in a German, European or international company.

Prerequisites: none

- **Specific Goals for the Module:**

- To provide an understanding, what are the specific aspects in business culture
- To learn the concept, how to assess the culture (on a company and/or national level)
- To get to know methods and tools, how to influence and change the culture in a company
- To understand how Culture and Innovation influence each other
- To gain a compass about what is typical in German, European or Asian culture
- To learn about "Hidden Champions" and if they are typical for German Culture

- **Applicable ABET Outcomes:**

After having successfully finished this module, the students will have:

- (a) an ability to analyze a social system, to meet desired needs within realistic constraints such as economic, social, political, and ethical
- (b) an ability to function on multidisciplinary teams
- (c) an ability to communicate effectively

- **Topics covered:** The students learn to analyze typical cultural aspects in order to understand differences in the social system of a company and use the knowledge to improve the processes and structures. Therefore, they work with appropriate analytical methods and apply their knowledge on real business examples, given by experienced international Managers.

Module name: *Engineering in a foreign country – Survive in discussions!*

- **Credits and Contact Hours:** 4 contact hours
- **Instructor:** Prof. Dr. Johannes Brombach
- **Textbook:** none

Supplemental materials: Extensive instructor's notes/handouts/overheads

- **Specific Module Information:**

The students do not need to speak German to survive in international business. However, it is nice to know a few key methods of translation and how to understand the basic language structure of German in order to efficiently participate in a discussion. The main goal is to apply the knowledge learned and to try it out.

Prerequisites: Module German workplace culture

- **Specific Goals for the Module:**

- To discuss an engineering topic, “tooth and nail” – Negotiation with language barriers
- To help yourself by using drawings, technical descriptions to make people understand
- To support efficient discussion outcomes by visualizing results
- To learn to translate foreign texts by using appropriate tools and methods
- To gain a better cultural understanding about small talk and body language – cross-cultural competencies

- **Applicable ABET Outcomes:**

- (a) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice
- (b) the broad education necessary to understand the impact of engineering solutions in a global, economic and societal context
 - (i) a recognition of the need for, and an ability to engage in life-long learning
 - (j) a knowledge of contemporary issues
- (b) an ability to function on multidisciplinary teams
- (c) an ability to communicate effectively

- **Topics covered:** The students learn and practice cross-cultural competencies. In group work/ set-up a scenario, they discuss and negotiate topics with Germans (that are not fluent in English). A technical problem is given. The students will have to apply their acquired knowledge in order to come up with good negotiation results. Afterwards, the role-play will be evaluated and a personal feedback will be given.

Module name: *R&D Management in a German context*

- **Credits and Contact Hours:** 12.5 contact hours
- **Instructor:** Prof. Dr. Klaus Pischetsrieder

- **Textbook:** none

Supplemental materials: Extensive instructor's notes/handouts/overheads

- **Specific Module Information:**

This module provides an overview of the development process for complex products like automobiles or machines. Topics include a general introduction to requirements and success factors for a successful product development from a German perspective. Goals, inputs and expectations of all stakeholders inside and outside the company are addressed. Main points are the tools and methods to manage and control the research and product development process.

Prerequisites: General understanding of collaboration and interaction of the functions, marketing and sales – design – manufacturing, project management

- **Specific Goals for the Module:**

- To provide an understanding of a research and product development process
- To teach the fundamental concepts and techniques used in product development
- To provide an understanding of the key questions of product development and some solutions from German best practice companies

- **Applicable ABET Outcomes:**

After having successfully finished this module, the students will have:

- (a) An ability to apply knowledge of management, organization and engineering
- (b) An ability to analyze and interpret complex tasks
- (c) An ability to identify, formulate and solve engineering problems
- (d) An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

- **Topics covered:** Tasks in product development, research and product development, organization of development projects, strategic product planning, planning and controlling product development processes, innovation management, managing product variants, dealing with technology and design changes, collaborative development projects.

- **Factory tour:** This module is combined with a factory tour.

Module name: *Case Study Competition*

- **Credits and Contact Hours:** 10 contact hours
- **Instructors:** Prof. Dr. Johannes Brombach & Prof. Dr. Jürgen Spitznagel
- **Textbook:** none

Supplemental materials: Extensive instructor's notes/handouts/overheads

- **Specific Module Information:**

In today's complex international business it is important to quickly understand the essential business kernel of an engineering company. The necessary ability and knowledge can be best acquired by solving a real case study of an international engineering company, based in Germany. The module is designed as a case study competition between several student teams. The teams get all the needed tools and methodology to do the consulting job. Based on the same background information about the company, the teams develop their individual business solutions and present their cases to the jury.

Prerequisites: none

- **Specific Goals for the Module:**

- To provide methods and tools to solve a complex business case of an international engineering company
- To analyze and understand the business models, the market specifics and the challenges of the selected business case
- To enable the students to evaluate different strategic directions regarding technology and cost position as well as market viability and success
- To enable the students to develop a short management presentation with all the key findings and their recommendations
- To learn from the other teams and give feedback to each other

- **Applicable ABET Outcomes**

After having successfully finished this module, the students will have:

- (a) an ability to analyze and interpret data, as well as to use the techniques, skills, and modern engineering tools necessary for engineering practice
- (b) an ability to come up with strategic directions to meet desired needs within realistic constraints such as economic, environmental, social, manufacturability, and sustainability
- (c) an ability to function on multidisciplinary teams
- (d) an ability to identify, formulate, and solve engineering problems
- (e) an ability to communicate and create a management presentation effectively

- **Topics covered:** The students get an introduction about the necessary tools and methods to solve a complex business case. The module is based on a real business case of a German engineering company in trouble. 3-4 different student teams try to understand the described

Program and Module Description EGW

scenario regarding the most important technological and business aspects and come up with a turnaround strategy. The individual strategies will be presented in a “battle” in front of a jury.

Module name: *Entrepreneurs for industrial services*

- **Credits and Contact Hours:** 10 contact hours
- **Instructors:** Prof. Dr. Jörg Elias & Prof. Dr. Andreas Rieger
- **Textbook:** none

Supplemental materials: Extensive instructor's notes/handouts/overheads

- **Specific Module Information:**

This module is all about entrepreneurship and creative development of industrial service offerings. The module starts with an introduction to current megatrends in industrial services as well as several successful business models in Germany. The module also provides an introduction into the necessary tools and techniques to create a new business idea as an entrepreneur. The students are challenged to develop a new service offering in a competition between several teams and present their business cases to the jury. These concepts may include market analysis, competitive analysis, value proposition, service processes and profit/loss calculation.

Prerequisites: Module Service business in Germany

- **Specific Goals for the Module:**

- To analyze and understand the business models, the market specifics and current megatrends in industrial services
- To provide methods and tools to create a business case for an innovative service offered in the mobility and transport area
- To enable the students to develop future market strategies for existing service offered in the light of the relevant megatrends
- To enable the students to evaluate different strategic directions regarding technology and cost position as well as market viability and success
- To enable the students to develop a short management presentation with all the key elements of the new business idea
- To learn from the other teams and give feedback to each other

- **Applicable ABET Outcomes**

After having successfully finished this module, the students will have:

- (c) an ability to formulate or design a system, process, or program to meet desired needs
- (d) an ability to function on multidisciplinary teams
- (f) an understanding of professional and ethical responsibility
- (g) an ability to communicate effectively
- (h) the broad education necessary to understand the impact of solutions in a global and societal context
- (j) a knowledge of contemporary issues

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- **Topics covered:** The principles of the entrepreneurship process are discussed. The students then are guided through the steps of generating, modifying, sharpening and defining business ideas. A set of tools such as Morphological Analysis, Empathy map and Blue Ocean Strategy are introduced to facilitate this process and to consecutively home in on a viable and profitable business model. The result is documented in a Business Model Canvas, a method widely used to document start-up business ideas. The individual team's service business ideas are presented in a competition in front of a jury.