

# Engineering Modules (EM)

State-of-the-art expertise in production systems & supply chains



## EM 1: Fundamentals in Production & Operations Mgmt

Industrial management and engineering is of holistic character. So far, industrial engineering has been aimed at integrating man, material, equipment, and funds in production systems. Now, activities also focus on the IT and technology infrastructure to control complex systems. Hence, the industrial engineer concept was enlarged from an 'efficiency expert' and 'productivity expert' by the concept of a 'knowledge worker'.

Today, industrial engineering also deals with **the development, optimization, installation, and management of holistic systems, consisting of man, materials, and infrastructure, for any type of production or service.** This module enables graduates to understand all necessary **concepts and underlying methods of industrial management.** It focuses on **deterministic and stochastic operations research** which is of great help for the planning process of logistic systems (modeling, simulation, etc.) and **IT concepts and tools** which accompany the product life cycle management process at the interface of product development and production.

## EM 2: Support of Production Systems

IT support of production systems is an essential part in state of the art production systems. E.g., virtual engineering is the early, continuous, integrated support of the development process as regards to the adjustment, evaluation, and concreteness of the development results from all partners with the help of virtual prototypes.

Modern production and logistic systems strongly depend on an appropriate **IT support** during the complete lifecycle. For this reason, this module focuses on understanding, generating, and analyzing models from various domains. On this basis, **evaluation and optimization methods** are applied to new problems and extended. Methodological competences are combined with scientific work in the areas of product lifecycle management, simulation, and optimization.

## EM 3: Methods of Operations Management

The ever-growing integration and globalization of production structures lead to an increasing importance of logistics for cost and performance development in operations networks. The design phase of products and processes is followed by the operations phase. Consequently, module EM3 focuses on the further development of the **corresponding skills and competences** in this field.

Participants are to enhance their knowledge in order to be able to understand **production and supply chain management taking into account human resources.**

At the same time, **mapping of the physical world onto the world of controlling** has to be understood. On this basis, this module concentrates on applying the lessons learned as well as on the further development of the methodology and its integration in the teamwork at the production company.

## EM 4: Networks of Supply & Production Systems

Today's competitive environment regarding supply chains has dramatically changed. Emerging economies such as China have become key players and have changed the view on modern network systems. Supply Chain Management plays a key role in Production & Operations Management. Having understood the individual objects in the added value chain, these have to be combined in the supply chain. This includes the internationalization of processes of values added, their distribution to physical and dispositive processes as well as methods for their planning and control.

For this purpose, new models have to be generated and existing models need to be further developed and adapted. **Multidisciplinary analysis of the production logistics point of view and its mathematical modeling** are of particular significance. In this way, the participants can derive profound statements relating to the performance of **novel network structures.**

## EM 5: Global Production & Distribution

Made in China is becoming more and more important for global acting companies. In 1990, China produced less than 3% of global manufacturing output by value; nowadays its share is nearly a quarter. The white heat of China's ascent formed supply chains which reach deep into South-East Asia.

Global players therefore continually extend their production sites in China. At the same time, the demand for engineers with highly developed technological know-how and the ability to meet the different on-site requirements is rapidly growing.

Due to this **the final engineering module takes place in Suzhou/ China (close to Shanghai) in cooperation with GAMI in AMTC.** It is composed of compact knowledge transfer in lectures, case studies as well as excursions and company tours. The latter will provide participants with profound insights into the practical implementations in a Chinese production environment. The module does not only provide state-of-the-art knowledge transfer on-site, but also allows useful exchange with professionals and executives working in China.



Order your free course guide book with detailed contents of the Master Program!



## Engineering Modules

### EM 1: Fundamentals in Production & Operations Mgmt

Courses: Introduction to POM | Information systems: Fundamentals of computer science for engineers | Operations research: Decision making with linear models & networks | Introduction to industrial engineering | Industrial services

### EM 2: IT Support of Production Systems

Courses: Information systems: Product lifecycle management | Stochastic models of manufacturing systems | Simulation of production systems | Operations Research: Decision making with discrete & nonlinear models

### EM 3: Methods of Operations Management

Courses: Operational & tactic supply network management | Human factors & ergonomics | Technologies of distribution networks | Production engineering

### EM 4: Networks of Supply & Production Systems

Courses: Supply network management: Inventory Management in an uncertain environment | Strategic supply network management | IT for logistic systems | International production

### EM 5: Global Production & Distribution Systems

Courses: Quality Management | Supplier Management | Smart Manufacturing & Automation with industry 4.0

