

# ICL2024 Special Session

## Call for Papers

### **Title:**

**Engineering education for production and service structures of the future**

### **Acronym:**

**IPW-Session**

### **Overview**

Technical education in the vocational and academic sectors is subject to constant change. This change is driven by technical and technological developments, changes in production and service structures and political influences. The replacement of Taylorist structures of work organisation by lean management from the 1980s onwards and increasing automation have halved the proportion of low-skilled employment to date and enormously increased the demands on skilled labour in Germany. The dismantling of functional hierarchies has led to greater personal responsibility and self-direction. Simple tasks have been replaced by complex, complete work processes, and individual work has been replaced by teamwork. [Frieling 1993, p.32] In addition, the inseparable combination of mechanics, electrical engineering/electronics and information technology in technical systems has produced highly qualified mechatronics engineers in many occupational fields. The 30% increase in the number of employees with higher vocational qualifications (technicians, master craftsmen) in Germany over the last 40 years is also an indicator of the higher demands placed on skilled labour.

The strongest growth, with a tripling of the proportion during this period, was among academically trained workers. On the one hand, this is due to an enormous shift from the manufacturing sector and the agricultural sector to the service sector, but on the other hand, it is also due to changes in the world of work. This is also associated with changing requirements for engineers. Business management thinking, project management skills, leadership, communication and negotiation skills, social responsibility, intercultural behavior, entrepreneurship and, of course, digitization are key buzzwords in this regard. Of course, the industry also expects an "all-rounder" in the relevant engineering discipline with a broad knowledge base.

A demand-oriented and employment-oriented engineering education must take this into account, whereby it has to be geared strongly to the job requirements in business and society that are determined by the specifics of engineering activities. In the context of the development of modern production and service structures, in addition to the actual technical education and its scientific fundamentals, communicative skills, ethical questions, critical ability in dealing with digital tools, information and data, thinking structures typical for engineers for the development, optimization and diagnosis of more complex smart technical systems, interdisciplinary cross over thinking and much more will get into the focus of engineering education. The promotion of such complex personality dispositions requires a humanistic engineering education, requires "Persönlichkeitsbildung".

The session "Engineering education for production and service structures of the future", organized by the Scientific Society for Engineering Pedagogy (IPW), addresses essential questions about the requirement-based engineering education against the background of development processes in economy. This includes objectives and content of engineering education and its methodological design.

## Topics:

- didactic design of engineering training
- Artificial intelligence in engineering education
- Work with augmented realities
- Laboratory didactics
- Entrepreneurship

## Program Committee

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