

## Basics of Industry 4.0



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The lecture deals with fundamental ideas, goals, requirements, and corresponding principles and technologies to enable solving the goals of the 4<sup>th</sup> industrial revolution. The presentation discusses the keywords strongly connected with the fundamentals of Industry 4.0, including the following items: digitalization, virtualization, Cyber physical systems (CPS), factory of the Future, standardization, open communication, Internet of Things (IoT) and Industrial Internet of Things (IIoT), cooperation, functional safety, cyber security, cloud and edge computing, modelling of the all production supply chain, top and shop floors.

These keywords will be associated to theoretical basis of Industry 4.0 and information and communication technology, which are to fulfil design and implementation of new production principles and their physical realization in factories of the future. The theoretical implementation basis goes out from: Reference Architecture Model of the Industry 4.0 (RAMI 4.0), new business models, models developed from the RAMI 4.0 (first one is the Industry 4.0 Component Model), Unified Modelling Language (UML), Open Platform Communication – Unified Architecture (OPC UA), Time Sensitive Networks (TSN), big data and big data processing, Asset Administration Shell (AAS), Digital Twins.

Author's aim is to enable interested colleagues from industrial as well as academic community to find the proper way how to be in the main development and implementation stream of technologies and knowledges for design, realization, commissioning, maintenance and supervision of factories of the future.

At last but not least, the contribution will refer of outputs from ad hoc audits in industrial factories in the South Moravia region with a goal of evaluation of their ability to implement the Industry 4.0 principles, procedures and technologies.

In the end of the contribution listeners will be acquainted with goals and technologies of one cooperation international project among German and Czech SMEs and University Research Centers. The project calls Digital representation of Assets as a configurable AAS for OT and IT production systems (RACAS) and deals with development and implementation of a framework for an according customer dependent configurable implementation of AASs. Main challenge is that the AAS interact conform and interoperable in the Industry 4.0 systems and can be widely adopted to the different needs of the asset types. Configuration of the I4.0 components is one of the big challenges which are to be done to succeed in any Industry 4.0 implementation and will be solved in this project.