Modulbezeichnung (eng.)	**Industrial Data Transport Technologies** (Industrial Data Transport Technologies)
Semester	WPM
ECTS-Punkte (Dauer)	5 (1 Semester)
Art	Wahlpflichtmodul Zertifikat Industrial Cyber-Physical Systems
Sprache(n)	Englisch
Studentische Arbeitsbelastung	60 h Kontaktzeit + 90 h Selbststudium
Voraussetzungen (laut MPO)	
Empf. Voraussetzungen	
Verwendbarkeit	MII
Prüfungsform und -dauer	Studienarbeit
Lehr- und Lernmethoden	Seminar, Praktikum
Modulverantwortlicher	D. Kutscher

Qualifikationsziele

In implementing Industrial Cyber Physical Systems, the aim is to create an optimal overall package by leveraging existing technological and economic potential through a systematic innovation process, with focus on the following overarching aspects: (i) Horizontal data, information and functional integration through value networks, (ii) End-to-end digital integration of engineering across the entire value chain and (iii) Vertical integration and networked CPS systems. Behind these different Integration aspects are two major structural and behavioural specifications that have to be addressed: structural connectivity and functional / behavioural interoperability between ICPS; that is, ICPS structures are not fixed and predefined. The students will learn how to use the prevalent data and information transport technology and IT configuration rules to automatically build a specific structure (topology) for every situation, including all the associated requirements in terms of models, data, communication, semantic and algorithms.

Lehrinhalte

In order to deliver integration, it is essential to ensure end-to-end digital integration of actuator and sensor signals across different levels right up to the upper levels of an enterprise. It is also necessary to develop modularization and reuse strategies in order to enable ad hoc networking and reconfigurability of ICPS systems, together with the appropriate smart system capability descriptions. Moreover, foremen, operators and MII-students need to be trained to understand the impact of the emergent data transport technologies on the running and operation of real industrial applications of ICPS. Basic concepts and overview of technologies that are used to perform data and information exchange between ICPS-components will be studied, such as: (i) XML (XML-Schema, DTD, XSLT); (ii) JSON; (iii) Web-Service Technologien; (iv) RPC, SOAP, REST, WSDL; (iv) Enterprise Integration Patterns, (v) IoT Protokolle; (vi) MQTT and alternative solutions like ZeroMQ, AMQP, etc. (vi) Industrial communication protocols and data formats such as OPC/OPC-UA, AutomationML, B2MML). In a complementary way to the contents of the ICPS-module, the students will learn, with emphasis in industrial use cases, the specifications and major characteristics of technologies used in the 4 first digitalization layers of the RAMI4.0.

Literatur

Information-Driven Production (Smart Manufacturing in Action). ARC Advisory Group. 2015.
https//isa-95.com/b2mml/; `https://opcfoundation.org/`

Lehrveranstaltungen		
Dozent	**Titel der Lehrveranstaltung**	**SWS**
N.N.	Industrial Data Transport Technologies	2
N.N.	Praktikum Industrial Data Transport Technologies	2