

Course: Smart factories

Questions related to the content of the 2nd Interim exam

Question	Where to find answer: lectures, slides
Explain Hierarchical structure of the factory - Automation pyramid and what structure is suitable for Smart factory?	Key approaches to smart factory development 1, slides 2, 3, 4, 5, 6, 7, 8, 9, 10
What are the main components of IoT	Key approaches to smart factory development 1, slides 14
How IIoT is different compared to IoT	Key approaches to smart factory development 1, slides 19,
Explain the Horizontal and Vertical intergration of smart factory (components, definition, key properties,...)	Key approaches to smart factory development 1, slides 21, 22, 23
Why traceability and transparency is so important for the smart factory (how we achieve transparency – sensors, material, information flow, sensors technology, ...?)	Key approaches to smart factory development 2, slides 2, 3, 4, 9, 10, 12
What is RFID and why is so important for the smart factory?	Key approaches to smart factory development 2, slides 5 - 8
Explain the communication in smart factory (key aspects, communication protocols – OPC UA, wired, wireless, M2M and IoT communication)	Key approaches to smart factory development 2, slides, 13 – 20, 22
Why referential architecture models of smart factory are important (starting point to bould the factory, structure)?	Referential architectural models of smart factories, slide 2
Explain the Reference Architectural Model Industry 4.0 – RAMI 4.0 (the structure, 3D, axis, standards integrated into the axis – only explanation, main content of the standard).	Referential architectural models of smart factories, slides 4, 5 , 6 , 7, 8, 9, 10, 11, 14, 16, 17)
What is administration shell? Digital data of products, systems, processes; data saving in local or global servers, importance of data structuring and communications between layers.	Referential architectural models of smart factories, slides 18, 19, 20.
What is global and local digital agent? The function and use of digital agents in different layers, for different levels?	<p>Referential architectural models of smart factories, slides 26, 28 – 31, example of LASFA model and integration of digital agents.</p> <p>Additional material for understanding the RAMI 4.0 and LASFA: Resman, M.; Pipan, M.; Simic, M.; Herakovic, N. (2019), <i>A new architecture model for smart manufacturing: A performance analysis and comparison with the RAMI 4.0 reference model</i>, https://doi.org/10.14743/apem2019.2.318</p>

Why the factory of the future should be a vision and not only the technological advancement?	The concept of distributed systems, slide 3, 6
How plant structure is important in terms to have distributed network, how modular design helps in achieving the distributed structure.	The concept of distributed systems, slide 4, 5, 6
What means a Customer - Centric Strategy when implementing the smart factory	The concept of distributed systems, slides 7, 8 , 9
Explain the concept of modular smart factory (modular products – modular factory, how planning is simplified, development methodology – steps, description, standardization,...).	The concept of distributed systems, slides 11, 12, 13, 14, 15, 16, 17
What is smart module in modular smart factory? CPS, fundamental principles, characteristics, how we can build smart factory from smart modules, standardization in different levels!?, plug and produce concept.	The concept of distributed systems, slides 19 - 22