Cyber-Physical Systems

Code: MK3KIBRR6R117-EN

ECTS Credit Points: 6

Evaluation: mid-semester grade

Year, Semester: 3rd year, 2nd semester

Its prerequisite(s): Modelling and Simulation Prototype Technologies I

Further courses are built on it: Yes/<u>No</u>

Number of teaching hours/week (lecture + practice): 0+4

Topics:

The industry's 4.0 manufacturing technology trends, its upgrades are inseparable from the total transformation of industrial proceedings. The new approach to manufacturing and some aspects of it worldwide is a paradigm with different names (industrial internet, industry 4.0, cyber physical manufacturing system) one of its building blocks contains the practical teaching of the module. One of the logical explanations can be found in the BMBF (Bundesministerium fur Bildung und Forschung – german alliance educational and research minister) obtaining finance section: „The flexibility of the cyber physical systems increases the usage of manufacturing systems (CPPS). This makes it possible for machines and sites to optimize themselves and reconfigure, their behaviour change in regards to the changing orders and manufacturing conditions. The interrelationship between the real and the digital world, in the modern manufacturing sites it creates the foundation for the „internet of things". In the centre of the systems there is a capability, to feel all incoming information, and conduct recognition out of this, and according to this they change their behaviour, and store the knowledge gained by experience. The intelligent manufacturing systems and processes, and the goal oriented engineering plans, methods and tools will become the most important factors of the shared and connected manufacturing winery, for the successful creation in the future „intelligent manufacturing sites,,. The intelligent manufacturing sites original conception, the internet of things. This phrase was created in 1999 to put everyday items in a web and the web operation RFID and sensory technology together. The expression 'cyber physical systems' (CPS) was first written down in 2006 as unified actualization of minimal requirements.

Literature:

Recommended:

- Lee, Edward A. and Seshia, Sanjit A.: Introduction to Embedded Systems, A Cyber-Physical Systems Approach, http://LeeSeshia.org, ISBN 978-0-557-70857-4, 2011.
- Lee, Edward A. "CPS foundations." Proceedings of the 47th Design Automation Conference.ACM, 2010.
- Shi, Jianhua, et al. "A survey of cyber-physical systems." Wireless Communications and Signal Processing (WCSP), 2011 International Conference on. IEEE, 2011.
- https://www.beckhoff.hu/
- http://graphit.hu/tecnomatix/

Schedule

1st week Registration week	
2nd week:	**3rd week:**
Practice: Creation of virtual production with discrete event-driven production & logistics. (with the most up to date software, 2017. TECNOMATIX/PLANT SIMULATION.	**Practice:** Creation of virtual production with discrete event-driven production & logistics. (with the most up to date software, 2017. TECNOMATIX/PLANT SIMULATION.
4th week:	**5th week:**
Practice: Creation of virtual production	**Practice:** Creation of virtual production

with discrete event-driven production & logistics. (with the most up to date software, 2017. TECNOMATIX/PLANT SIMULATION.	with discrete event-driven production & logistics. (with the most up to date software, 2017. TECNOMATIX/PLANT SIMULATION.
6th week:	**7th week:**
Practice: Creation of virtual production with discrete event-driven production & logistics. (with the most up to date software, 2017. TECNOMATIX/PLANT SIMULATION.	**Practice:** Creation of virtual production with discrete event-driven production & logistics. (with the most up to date software, 2017. TECNOMATIX/PLANT SIMULATION.
8th week: 1st drawing week	
9th week:	**10th week:**
Practice: Project selection& individual consultation.	**Practice:** Individual Consultation.
11th week:	**12th week:**
Practice: Individual Consultation.	**Practice:** Individual Consultation.
13th week:	**14th week:**
Practice: Individual Consultation.	**Practice:** Project submission & presentation.
15th week: 2nd drawing week	

Requirements

A, for a signature:

Participation in practical classes, according to Rules and Regulations of University of Debrecen. The correct solution of the project and its submission before deadline.

B, for a grade:

The practical grade is the evaluation of the project.