Name of the course: INFPHD647 Manufacturing engineering for I4.0 (complex exam preparatory)	Total credits: 6
Type of the subject: Optional	
Total hours of per semester: **lecture: 1** **practice: 2** **consultation: 1** **Other:**	
Type of testing: Practical course mark Other:	
Semester: 1 or 2	

Description

Effect of the industrial revolutions to the manufacturing technologies. Background infrastructure (CNC machines and PLC controlled production lines) and management theories of the flexible manufacturing systems
Creation of cyber-physical system (CPS), application example: CNC lathe and CAM system. M2M communications – standard protocols in case of PLC controlled production systems. Image processing applications example in manufacturing engineering (welding, cutting). Create feedback in closed-loop control system with sensors and data acquisition in production system (vibration & diagnostic). Students carry out an individual mini-project work, which is related to the I4.0 area.

Literature (Compulsory & Recommended)

Hegedus at al, 3D Scanner-Based Identification of Welding Defects 10.3390/s23052503
Magyar at al. Rendezetlen alkatrészek rakodási folyamatának fejlesztése 10.37775/EIS.2021.1.6
Karker at al. Product configuration system development for CAD/CAM software 10.37775/EIS.2020.2.5
Kiss at al. Automatic Manufacturing Cell in Cyber-physical System 10.3311/PPme.16623
Szunyi at al. Posztprocesszor fejlesztése kiber-fizikai rendszerben 10.37775/EIS.2020.1.8

Competencies

- Expertise in the application of the concepts and methods of software technology in modeling of complex software and architecture design. Ability to develop applications with real-time requirements.
- Ability to formalize complex technical problems, to analyze theoretical and practical background, and to provide adequate solutions.
- Expertise in design, development, operation and management tasks in the domain of complex software systems and database management systems.
- Skills for cooperation and team work, and ability to take leading role.
- Ability for written and oral communication in English, using the technical terms and expressions of computer science. Ability to argue, to prepare reports, to read, understand and exploit scientific and technical material (e.g. books and papers).
- Expertise in utilizing sources of technical information, their critical interpretation and evaluation, and the extraction of information relevant to the solution of a specific problem.
- Ability to perform supervised scientific research, and skills required for post-graduate studies.

Attitude

- Attends professional, technological development related to their qualification.
- Commitment to critical feedback and self-assessment.
- Commitment to lifelong learning and receptivity to new IT competencies.
- Adopts and coordinates the ethical principles of work, organizational culture and research.
- Shares professional knowledge, mediates professional results.
- Mediates and implements eco-conscious behavior and social responsibility, helping them with IT tools.
- Commitment to quality standards and its IT tools.
- Open to initiate collaboration with IT and other specialists.

Autonomy and responsibility

- Takes responsibility for his professional decisions taken during his professional activities.
- Takes responsibility for observing and enforcing deadlines.
- Takes responsibility for own and fellow workers' work.
- In the case of operational critical IT systems, he/she can be assigned responsibility for development and operation, according to his/her professional competencies.

Responsible of the subject: Andó Mátyás, associate professor, habil

Additional lecturers: