

System integration - course description

General information	
Course name	System integration
Course ID	11.3-WE-INFD-IntegrSyst-Er
Faculty	Faculty of Computer Science, Electrical Engineering and Automatics
Field of study	Computer Science
Education profile	academic
Level of studies	Second-cycle Erasmus programme
Beginning semester	winter term 2022/2023

Course information	
Semester	3
ECTS credits to win	4
Course type	optional
Teaching language	english
Author of syllabus	

Classes forms					
The class form	Hours per semester (full-time)	Hours per week (full-time)	Hours per semester (part-time)	Hours per week (part-time)	Form of assignment
Lecture	15	1	-	-	Credit with grade
Project	45	3	-	-	Credit with grade

Aim of the course

- Introduction to IoT integration in monitoring and visualization
- Introduction to modern method of tracking and identification of vehicles and products
- Design and implementation of HMI using IoT tools
- Introduction to selected work scheduling methods of machines and vehicles

Prerequisites

Object-oriented programming, databases

Scope

Monitoring and visualization of conventional and autonomous vehicles:

- Monitoring vehicle parameters with IMU (Inertial Measurement Unit)
- Implementation of monitoring system in Windows using WiFi
- Vehicle performance visualization using NGIMU

Tracking vehicles and goods

- Introduction to Openmatics DeTAGtive IoT
- Identification of machines and goods using DeTAGtive
- Implementacja in Android

Introduction to work scheduling of vehicles and machines

- Max plus algebra
- System modelling
- Implementation of predictive scheduling

IOT Environment: Keep it simple. Manage Everything (KIS.ME)

- system integration with IoT buttons and lights
- Essential Key Performance Indicators, KPI
- Monitoring system performance with trends and histograms

Teaching methods

Lecture: conventional lecture

Project: dedicated project tasks

Learning outcomes and methods of their verification

Outcome description	Outcome symbols	Methods of verification	The class form
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Outcome description	Outcome symbols	Methods of verification	The class form
Can integrate selected IoT tools within a system realizing a desired mission		<ul style="list-style-type: none"> • a preparation of a project • an observation and evaluation of the student's practical skills • an ongoing monitoring during classes 	<ul style="list-style-type: none"> • Lecture • Project
Has essential knowledge about select IoT tools		<ul style="list-style-type: none"> • an evaluation test • an ongoing monitoring during classes 	<ul style="list-style-type: none"> • Lecture • Project
Has an essential knowledge enabling integration of IoT and HMI		<ul style="list-style-type: none"> • an evaluation test • an observation and evaluation of the student's practical skills 	<ul style="list-style-type: none"> • Lecture • Project
Can work individually and within a group		<ul style="list-style-type: none"> • an observation and evaluation of the student's practical skills 	<ul style="list-style-type: none"> • Lecture • Project
Has an essential knowledge and can implement schedulling tools for machines		<ul style="list-style-type: none"> • a preparation of a project • an evaluation test • an observation and evaluation of the student's practical skills 	<ul style="list-style-type: none"> • Lecture • Project

Assignment conditions

Lecture - positive scores of written tests

Project - positive scores concerning all designated project tasks

Final score composition = lecture: 40% + project: 60%

Recommended reading

Gerber A., Craig C.: Android Studio. Wygodne i efektywne tworzenie aplikacji, Helion, Gliwice 2016

Ross E., Ross J.: Unity i C#. Podstawy programowania gier, Helion, Gliwice, 2018

Heidergott, B., Geert Jan Olsder, and Jacob Van Der Woude. Max Plus at work: modeling and analysis of synchronized systems: a course on Max-Plus algebra and its applications. Vol. 48. Princeton University Press, 2014.

Documentation of Next Generation Inertial Measurement Unit: <http://x-io.co.uk/ngimu/>

Documentation of Openmatics Detagtive: <https://aftermarket.zf.com/go/en/openmatics/home/>

Further reading

Notes

Modified by prof. dr hab. inż. Marcin Witczak (last modification: 22-04-2022 09:40)

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