Tárgy neve: <u>Introduction to Vehicles and Sensors</u>

Tárgyfelelős neve: Istenes Zoltán

Tárgyfelelős tudományos fokozata: PhD

Tárgyfelelős MAB szerinti akkreditációs státusza: AT

Az oktatás célja angolul / Aim of the subject:

Knowledge:

- Possession of complex and up-to-date knowledge, including technology, capabilities, limits of vehicle sensors, vehicle interconnect networks and architectures, and intelligent transportation systems, standards, protocols, design methods, architectures, state of art use cases.
- Knowledge of the principles of autonomous vehicle sensors, vehicle interconnect networks and architectures.
- Detailed and expert-level knowledge of the technical terms and expressions of computer science in English

Abilities:

- Expertise in the selection and utilisation of vehicle sensors and vehicle interconnect networks and architectures,
- Ability to formalize complex technical problems, to analyse 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 teamwork, 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 behaviour 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, 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

Az oktatás tartalma angolul / Major topics:

Perception sensors focus on land robotics

1. Principles of autonomous vehicles, and self-driving cars 2. Hardware and software architectures 3. Sensors, interconnect networks, actuators, processing elements 4. Radars, LIDAR's, cameras, ultrasonic, GPS, and other sensors 5. CAN, LIN, MOST, FlexRay vehicle interconnect networks and architectures 6. Intelligent transportation systems

A számonkérés és értékelés rendszere angolul / Requirements and evaluation:

Mixed assessment, exam

Irodalom / Literature:

- Ingemar J. Cox, Gordon T. Wilfong: Autonomous Robot Vehicles. • Springer Science & Business Media, 2012. ISBN 1461389976, 9781461389972
- Dimitrakopoulos, G., & Demestichas, P. (2010). Intelligent transportation systems. IEEE Vehicular Technology Magazine, 5(1), 77-84.
- Luettel, Thorsten, Michael Himmelsbach, and Hans-Joachim Wuensche. "Autonomous ground vehicles—Concepts and a path to the future." Proceedings of the IEEE 100.Special Centennial Issue (2012): 1831-1839.
- Buehler, Martin, Karl Iagnemma, and Sanjiv Singh, eds. The DARPA urban challenge: autonomous vehicles in city traffic. Vol. 56. springer, 2009.
- Janai, Joel, et al. "Computer Vision for Autonomous Vehicles: Problems, Datasets and State-of-the-Art." arXiv preprint arXiv:1704.05519 (2017).
- Fossen, Thor I., Kristin Y. Pettersen, and Henk Nijmeijer, eds. Sensing and Control for Autonomous Vehicles: Applications to Land, Water and Air Vehicles. Vol. 474. Springer, 2017.