



Course	Computational Engineering and Technical Physics: Automatic Traffic Surveillance, 3 ECTS credits
Year and period	M.Sc. 1-2, 17-21.7.2017
Teacher(s)	Professor Adam Herout, Brno University of Technology, Czech Republic
Person(s) in Charge	Associate Professor Arto Kaarna, LUT
Additional information	The number of course attendants is limited to 20.
Aims	After fulfilling all requirements of this course, the student will: <ul style="list-style-type: none">- know the typical challenges and research questions in the traffic surveillance- know the traffic surveillance datasets and will be able to utilise the contents of the datasets- be able to propose and implement solutions for traffic surveillance- understand the problems and available solutions to surveillance camera calibration
Content	The course includes topics on: <ul style="list-style-type: none">- Camera calibration- Processing video sequences- Feature extraction, detection, recognition of vehicles.- Re-identification of vehicles, general traffic analysis.- Utilising data in traffic datasets The course is proposed to be suitable also for doctoral studies.
Modes of Study	<ul style="list-style-type: none">- Pre-assignment, 10 hours- Lectures, 20 hours- Exercises, 15 hours- Exam, 3 hours- After-course assignment, 30 hours Total workload 78 hours

Evaluation	Pass/fail. Evaluation: <ul style="list-style-type: none"> - Exam 50% - After-course assignment 50%
Study Materials	<ul style="list-style-type: none"> - Dominik Zapletal, Adam Herout: Vehicle Re-Identification for Automatic Video Traffic Surveillance. ATS-CVPR 2016. - Jakub Sochor, Adam Herout and Jiří Havel: BoxCars: 3D Boxes as CNN Input for Improved Fine-Grained Vehicle Recognition , CVPR 2016. - Markéta Dubská, Adam Herout, Roman Juránek and Jakub Sochor: Fully Automatic Roadside Camera Calibration for Traffic Surveillance, IEEE ITS 2014.
Prerequisites	Recommended: advanced knowledge in pattern recognition, computer vision, fluency in programming. For LUT students. Recommended: BM40A0701 Pattern Recognition, BM40A0801 Machine Vision and Digital Image Analysis, BM40A0901 Computer Vision.