### Topics of dissertations for the admission procedure to the doctoral program at the CTU in Prague Faculty of Transportation Sciences

**Commencement of Study:** 1. October 2024

**Department of Applied Mathematics (K611)**

**Study programme:** Smart Cities

<table>
<thead>
<tr>
<th>Supervisor</th>
<th>Prof. Ing. Ondřej Přibyl, Ph.D.</th>
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</thead>
<tbody>
<tr>
<td><strong>Topic:</strong></td>
<td>Integration of cooperative and automated vehicles into traffic management</td>
</tr>
<tr>
<td><strong>Research topic is:</strong></td>
<td>agreed with supervisor</td>
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<tr>
<td><strong>Language:</strong></td>
<td>English</td>
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</tbody>
</table>

**Abstract:**

Cooperative and automated cooperative vehicles (CAVs) are facing an enormous growth in both research and commercial projects. However, there is still limited knowledge of how to manage properly CAVs and how to integrate them into traffic and urban management. As part of this work, the student designs and implements algorithms for traffic control and optimization in the network with regard to autonomous vehicles. The topic is thus focusing on distributed traffic control methods using multi-agent systems. The algorithms will include topics such as load balancing in the network (using routing), recommendations for changing the speed with regard to the green wave and traffic harmonisation, and others. As part of this work, the possibilities will be analyzed and new algorithms will be designed and further verified using simulation tools to determine their impact on transport and the environment.

**References:**


**Number of doctoral students:** 1

**Form of study:** full-time
**Supervisor:**
Prof. Ing. Ondřej Přibyl, Ph.D., supervisor - specialist: Ing. Michal Matowicki, Ph.D.

**Topic:**
Modeling of activity behavior with respect to mobility in smart cities

**Research topic is agreed with supervisor**

**Language:** English

**Abstract:**
The aim of this thesis is to learn about the factors affecting travel behavior in smart cities, especially with respect to new travel modes and concepts (for example mobility as a service). This includes mathematical modelling and microscopic simulation of daily activity plans and the decision making process. Part of the work will include modification of simulation tools, with regard to measuring the impact of policies focusing on mobility as a service. It will be necessary to study the existing possibilities of microsimulation tools MatSim or SUMO, propose a solution to this topic and verify the approach in simulations.

**References:**


**Number of doctoral students:** 2

**Form of study:** full - time