



The **Chair of Operations Management** of **TUM School of Management** is looking for interested and qualified students to conduct an

Interdisciplinary Project (IDP)

on the topic

Development, Implementation and Evaluation of a Minibus-Sharing Optimization Model

Background:

In major cities like Munich, Hamburg or Berlin up to 50% of all households decided to not own a car. Over the last 10 years, the amount of young households without a car grew by 71% to 2.4 million across Germany. This trend was made possible through comfortable alternatives for most trips.

In some cases, however, neither public transportation nor car sharing is a good solution. Some shopping centers and furniture stores, for example, are located outside of the city center. Getting there might be time consuming and expensive.

LIINITA is a Munich based start-up working with these kind of retailers to provide a convenient shared transportation to their stores. Customers will be able to use their smartphone to order a minivan that will pick them up at home to bring them to the shopping center and back.

Project description:

The goal of this interdisciplinary project (IDP) project is to outline, develop and improve the IT infrastructure needed for LIINITA to provide its service. There are several components the students will be able to work on:

- A backend system calculating optimal vehicle routes
- A business intelligence solution that allow business insights, improves capacity forecasting, etc.
- A customer facing website and apps
- A driver facing app

Within this interdisciplinary project, 1-3 students shall develop and evaluate efficient solutions to one or more of these challenging problems. Solutions should be coded in an object-oriented programming language.

The student team will model the problem accordance with the advisor from LIINITA and the chair of Operations Management as a special case of a dial-a-ride problem. Based on the model, the students will develop different algorithms.

They will be awarded 6 ECTS credit points for the model and the heuristics design. The chair will assign additional 4 ECTS credit points for the implementation and deployment of the heuristic. Deliverables will be the source code as well as the documentation of it, elaborating on how the source code works.

In accordance with the practical assignment, the IDP candidate shall participate in the course "Modeling, Optimization and Simulation in Operations Management (MOS)" (WI000974, 6 ECTS),



offered by the Chair of Operations Management. The course covers the formulation of economic decision problems as mathematical optimization models and their implementation in state of the art solver software (IBM CPLEX/OPL). These academic insights will be needed by the candidates in order to successfully model the dial-a-ride problem and design the heuristic. The candidate must pass an oral exam on the course topics at the end of the interdisciplinary project.

Project Timeline:

The timeline can be adjusted to the students' preferences, for example if the student team would like to keep the semester break free, the work packages may be distributed to the time before and after.

- Mid-June 2014: Project Kick Off
- Mid-June to mid-July 2014: Research relevant literature and studies; Modeling of the problem
- Mid-July to August 2014: Conceptualize and develop different algorithms to provide travel options and vehicle routes
- August 2014: Implementation and benchmarking profitability of the different algorithms
- October/November 2014: Deployment of the solution and documentation of all results
- November 2014: Oral exam on course "Modeling, Optimization and Simulation in Operations Management (MOS)"

Advisors:

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Any interested student, please send by email your application together with your curriculum vitae and transcripts of records.