Self Driving Car Specialization

- Localization and mapping
- Static and dynamic object detection
- Behaviour and maneuver planning
- Vehicle control

Introduction to Self-driving Cars

- Design a basic hardware system
- Identify main components of the autonomous driving software
- Create a safety assessment strategy for a self-driving car program

State Estimation and Localization

- Understand the key methods for parameter and state estimation
- Develop and use models for typical vehicle localization sensors
- Apply Kalman filters to a vehicle state estimation problem
- Register point clouds from LIDAR to 3D Maps

Visual Perception for Self-Driving Cars

- Project 3D points onto the camera image plane
- Calibrate the pinhole camera model
- Apply feature detection algorithms for localization and mapping
- Develop and train neural networks for object detection and semantic segmentation

Motion Planning for Self-Driving Cars

- Devise trajectory rollout motion planning
- Calculate the time to collision
- Define high-level vehicle behaviours
- Develop kinematically feasible paths through environments
- Compute velocity profiles

Motion Planning for Self-Driving Cars

- Plan behaviours and execute maneuvers to navigate through the world
- Gain valuable experience in debugging and testing in the Carla simulator

Specialization Prerequisites

- Proficient in linear algebra
- Comfortable with statistics
- Comfortable with basic calculus and physics