

Mobile Robots are increasingly working in close interaction with human beings in environments as diverse as homes, hospitals, public spaces, public transportation systems and disaster areas. The situation is similar when it comes to Autonomous Vehicles, which are equipped with robot-like capabilities (sensing, decision and control). Such robots must balance constraints such as safety, efficiency and autonomy, while addressing the novel problems of acceptability and human-robot interaction. Given the high stakes involved, developing these technologies is clearly a major challenge for both the industry and the human society.

The objective of this course is to introduce the key concepts required to program mobile robots and autonomous vehicles. The course presents both formal and algorithmic tools, and it also provides realistic examples and programming exercises in Python. It covers topics such as Sensor-based mapping and localization, Fusing noisy and multi-modal data to improve robustness, and Integrating human knowledge to be used for scene interpretation and decision making.