



Politechnika  
Wroclawska

# Mobile robotics Introduction

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## Contact information

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please use appointlet link from the webpage to book a meeting

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Course page:

<http://kcir.pwr.edu.pl/~jjakubia/MobileRobotics/>

1. Introduction. Applications and problems in mobile robotics. Kinematic models of mobile robots
2. Mathematical foundations of probabilistic robotics
3. Sensory data filtering and fusion
4. Robot localization: odometry, Markov models, EKF
5. Mapping: metric, topological and hybrid maps
6. SLAM: basic idea, methods
7. The problem of exploration
8. Current research trends in mobile robotics



# Literature

- ▶ S.Thrun i in. Probabilistic robotics. MIT Press, 2006
- ▶ R.Siegwart. Introduction to Autonomous Mobile Robots. MIT Press, 2011
- ▶ A.Kelly. Mobile Robotics: Mathematics, Models, and Methods. Cambridge University Press, 2013
- ▶ Handbook of robotics. Springer, 2008
- ▶ H.Choset et al. Principles of Robot Motion: Theory, Algorithms, and Implementations. A Bradford Book, 2005
- ▶ M. Ben-Ari, F. Mondada, Elements of Robotics, Springer 2018
- ▶ The DARPA Urban Challenge. Springer, 2010

1. Introduction. Communication in ROS.
2. Incremental methods of self-localization
3. Feature based localization
4. Data fusion in localization
5. Occupancy grid map
6. Robot motion planning
7. Motion controller
8. Integration of subsystems, summary of results

## Lecture

- ▶ Exam (passing the laboratory is required to be admitted to exam)

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## Laboratory

- ▶ obligatory participation
- ▶ entry requirements for each task
- ▶ evaluation of laboratory tasks realization
- ▶ written reports (pdf by email within 1 week after the task)