ELEC3210 Machine Learning and Information Processing for Robotics Fall 2023

■ Course Description

The real course title should be "**Introduction to Mobile Robotics**" in Fall 2023. This course gives a comprehensive introduction to mobile robot and autonomous navigation. The goal of this course is to expose students to relevant conceptual knowledges, mathematical foundations and algorithms, and help them to develop real-time software modules for autonomous navigation. Topics to be covered include ROS, locomotion, sensors, SLAM, motion planning and advanced robotics.

■ Platform

Online Canvas Discussion Panel

Offline weekly with TAs meeting at meeting Room, Floor G, CKSRI, Thursday 19:00-20:00

■ Team

Instructor

Prof. Huan Yin (eehyin@ust.hk)

Teaching Assistant

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■ Timetable (Tentative)

Lecture	Date	Contents	Projects
L1	04/09	Robotics, Autonomous Mobile Robot	**(Install Ubuntu & ROS)**
L2	06/09	Pose, ROS	
L3	11/09	Localization, Wheeled Locomotion	
L4	13/09	Sensors	
L5	18/09	Iterative Closeset Point	**P1 - ICP odometry**
L6	20/09	Map Representations	
L7	25/09	Bayes Theorem, Gaussian Distribution	
	27/09 - 4/10	National Day / IROS 2023 Conference	
L8	09/10	Particle Filter and MCL	
L9	11/10	Kalman Filter, EKF	**P1 Out**

L10	16/10	SLAM and EKF SLAM	**P2 - EKF SLAM**
L11	18/10	Graph SLAM	
L12	23/10	Place Recognition	
L13	25/10	Advanced Topic – Visual SLAM 1 (TBD)	
		Advanced Topic - Visual SLAM 2	**P2 Out**
		Path Planning 1	**P3 - Planning**
		Path Planning 2	
		Trajectory Planning – Guest Lecturer by Haokun	
		Advanced Topic – Drones (TBD)	
		Summary and Future Mobile Robots	
		Project 3 Time	**P3 Out**
		Study Break	

■ TextBooks (Non Compulsory)

- Siegwart, Roland, Illah Reza Nourbakhsh, and Davide Scaramuzza. **Introduction to autonomous mobile robots**. MIT press, 2011.
- Thrun, Sebastian. "**Probabilistic robotics**." Communications of the ACM 45.3 (2002): 52-57.

■ Grading Scheme, No midterm or final exams (Tentative)

		Note
Quizz	20%	Randomly conducted in lectures
Homework	30%	Submit after lectures
Project	P1 10% P2 20% P3 20%	• Online projects • Linux/C++ Required • Submit Video & Code & Report