Couse Information

Course Code	ROB5002-41	Course Title	SLAM (Simultaneous Localization and Mapping)
Year/Semester	2024 / 1st Semester	School	Department of Intelligent Robotics
Class Time/Classroom	Tue 10:30-11:45 Thu 09:00-10:15	Grading Type	Letter grade

Instructor Information

Instructor	Office	Tel.	E-mail	Office Hours
Hyeonwoo Yu 유현우	#23338		hwyu@skku.edu	

Course Objectives & Description

This course introduces classical and modern topics in Simultaneous Localization and Mapping (SLAM) to graduate level students. Since SLAM is based on the traditional probabilistic estimation theory for modeling measurement models and dynamic models of sensors and mobile robots, topics include the concepts of robot observations, measurements and dynamic models, MLE, Bmse, Sequential models, Markov chain, Bayesian Linear Filter, Nonlinear Filter, Graph optimization, Least square and Manifold, Filter-based SLAM and Graph SLAM.

Textbook & Reference

Introduction to Simultaneous Localization and Mapping I; Author, Hyeonwoo Yu, Publisher, Sungkyunkwan University

Probabilistic Robotics; Author, Sebastian Thrun, Wolfram Burgard and Deiter Fox, Publisher, The MIT Press

Attendance (%)	Midterm Exam (%)	Final Exam (%)	Quizzes (%)	Individual Assignments (%)
10.0	25.0	25.0		
Reports (%)	Presentations (%)	Etc1 (%)	Etc2 (%)	Total (100%)
40.0				100.0

Weekly Schedule (can be changed)

Week 1	Introduction and review of the robot perception and SLAM
Week 2	Review of Probability and Estimation
Week 3	Maximum Likelihood Estimation and Bayesian Mean Square Error
Week 4	Sequential Measurement and Posterior
Week 5	Markov Chain and Dynamic Model
Week 6	Bayesian Linear Filter
Week 7	Nonlinear Filter: EKF and Particle Filter
Week 8	Midterm Exam
Week 9	Measurement and Landmark
Week 10	Filter-based SLAM: EKF SLAM
Week 11	Filter-based SLAM: Fast SLAM
Week 12	Least Squares and Manifold
Week 13	Graph Optimization
Week 14	Graph SLAM
Week 15	Final Exam

Notes and Remarks

Remarks