

B31YS-4th year Robotics Systems Science

Week	Activity (academic lead)	Expected outcome from teams (student lead)	Lead academic
1	Introduction to module. Initial introduction to turtlebot and ROS	<ol style="list-style-type: none"> 1. Watch Videos about ROS provided (ETH) 2. Install ROS image (provided) on your personal laptop. 3. Do course ROS in a week from ROS ignite and complete first task (see separate sheet). 	Yvan Petillot Helmi Fraser
2	Basic Motion Planning and ROS	<ol style="list-style-type: none"> 1. Complete ROS in a week.. 2. Demonstrate simple motion planning (W2 assessment) 3. Attend ROS Lab Session 	Yvan Petillot Helmi Fraser
3 & 4	Filtering and Localisation Probabilistic robotics	<ol style="list-style-type: none"> 1. 3 hours lab session (matlab for KF) 2. AMCL in simulation using Laser + odometry. 3. Demonstration of one method (EKF/PF) on rosbags – odometry + GPS - 5% of final mark 	Sen Wang
5 & 6	Introduction to computer vision	<ol style="list-style-type: none"> 1. Course supported by QUT course (3 hours). Image formation, Perspective geometry, Epipolar geometry, stereo vision, visual odometry, feature extraction, OpenCV. Presentation by students. Feedback provided. 2. Course (3 hours). Image formation, Perspective geometry, Epipolar geometry, stereo vision, structure from motion, feature extraction, OpenCV. 3. Camera calibration lab 4. Demonstration of assignment in real robot or simulator – 5% of final mark 	Tomasz Luczynski
7	Visual Slam	<ol style="list-style-type: none"> 1. EKF SLAM, Graph SLAM, Loop Closure with bags of words 2. Implementation of one existing implementation of visual slam in ROS on 	Sen Wang

		turtlebot. - 5% of final mark	
8	Task planning	<ol style="list-style-type: none"> 1. Student presentations on path planning (DWA, Potential Fields, A*, RRTs) 2. Task / Mission planning 3. Final Project selection 4. Presentation on choice of SLAM algorithm from week 7. 5% of final mark	Yvan Petillot Yaniel Carreno
9-12	Project work	Can be proposed by students, 30 % of final mark	ALL
12-14	Exam	2 hours, 50% of final mark	