Course Catalogue

Module Code	Semester	ECTS	SWS	Lecture	Tutorial	Lab
MECH-M-2-ROB-ROB-ILV	2	4	1	1	0	0

Course Name	Robotics		
Lecturer	D. T. McGuiness, Ph.D (Daniel.McGuiness@mci.edu) (4A-434c)		
Study Programme	Mechatronik Smart Technologies		
Official Name	Robotik	**Course Language**	English
Lecture Prerequisites	The student should be comfortable with working with either. Python and/or. C++ and should have an beginner level knowledge of the. Linux environment and the command line interface		
Course Objectives	WARNING: This is the content only covered by me as this lecture is shared by Prof. Can Dede and Benjamin Massow, M.Sc. The goal of this lecture is to give you a better view of how to control robots using different programming methods. This lecture you will use ROS, a versatile software capable of doing pathfinding and localisation, a perfect fit for use in mobile robotics.		
Primary Course Content	Lecture Homepage on GitHub | WebBook		
Secondary Course Content(s)	*A Concise Introduction to Robot Programming with ROS2* by F. M. Ric, *Programming Principles and Practice using C++* by B. Stroustru,		
Homework(s) and Project(s)	Personal Assignment (100)		

Assessment Criteria	Assignment Type	Effect	Count
	Personal Assignment	100	1
	Sum	100	

Lecture Structure

Order	Topic	Units	Self Study
1	Mobile Robot Localisation	4	6
	Introduction | The problems of Noise and Aliasing | Localisation v. Hard-Coded Navigation | Representing Belief | Representing Maps | Probabilistic Map-Based Localisation | Other Examples of Localisation Methods | Building Maps		
2	The GNU/Linux Operating System	4	6
	Learning the Linux Command Line | Installation | Docker | The Structure of Commands | Helpful Keyboard Shortcuts for the Terminal | When you need help with Commands | Additional Information | A Detailed Look in ls Command | Creating and Removing Folders | Move, Copy and Delete Files and Folders | Role to Users and sudo | File Permissions | Hard and Symbolic Links | The Linux File System | Common Command-Line Tools and Tasks | Advanced Topics		
3	ROS 2 Introduction and Concepts	4	6
	Introduction | Publisher and Subscriber Architecture | Nodes - The Building Blocks | The Discovery Process | Communication Between Nodes | Topics | Services | Actions | Parameters | Working with Command Line | Launch File | Intermediate Concepts | Configuring Quality of Service | Advanced Concepts		
4	Programming with Client Libraries	4	6
	Setting the Environment | Turtles and Graphs | A Deeper Look into Nodes | Working with Topics | Working with Services | Working with Parameters | A Practical Look into Actions | Launching Nodes | Getting Started with Colcon | Creating a Workspace | Creating a Package | Writing a Simple Publisher & Subscriber | Writing a Simple Service and Client | Creating Custom msg and srv Files | Using Parameters in a Class | Managing Dependencies | Creating an Action | Writing an Action Server and Client | Writing a Launch File		
5	Simulations and TF Trees	4	6
	A Gentle Introduction | Writing a Static Broadcaster		
6	SUM	15	30

- Any major announcements will be made on SAKAI regarding any possible date/content/structural changes for the assignment(s), exam(s).
- Any lecture material will be posted at the lectures corresponding GitHub home-page. The link will be present on the lectures SAKAI homepage.

- If there are any questions regarding course content/exams/assignments please do not refrain from contacting me (Daniel.McGuiness@mci.edu).