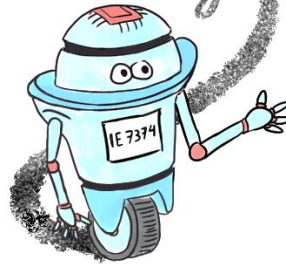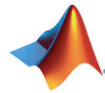# Reinforcement Learning with MATLAB

Prof. Rifat Sipahi
Prof. Mohammad Dehghani
Sahil Belsare

🔲 **Lab structure**

This section provides a broad overview of the lab structure. It is divided into 4 stages.

➢ In stage 1 we start with learning RL concepts by manually coding the RL problem. Later we see how the same thing can be done by using functions available in MathWorks RL toolbox.

➢ In stage 2, we deal with complex environments and learn how Deep Learning agents are modelled and trained. Additionally, we see how to custom build an environment in MATLAB.

➢ In Stage 3 we introduce Simulink. We develop environments using Simulink RL blocks.

➢ In Stage 4 brings us to **additional** environments of Mechanical and Industrial Engineering problems, that we will build using the concepts taught before.

🔲 **Modules:**

Stage	Module	Type	Comment
1 LINK	Simple MDP with manual Qlearning Agent	Class Module	Open the file Template_MDP_MATLAB Environment first
	Simple MDP with MATLAB Q-learning	Class Module	Open the file MDP_Train_MATLAB first
	Gridworld with SARSA	Assignment	
	Formulate MDP for given problems	Assignment	
2 LINK	Stochastic Gridworld with DQN	Class Module	Open the file StochasticGridworld
	Limitations of Tabular Agents	Explanation Doc	
	Custom Cart-Pole with DQN	Class Module	Open the file CartPole_DQN
	Assignment - Explore RL Training App Plot reward curves with different epp, gamma and initial q values	Assignment	
3 LINK	Controling Thermal Model of a House using a DDPG Agent	Class Module	Open the file ddpg_live(new)
4	Robot Walking	Class Module	
	Portfolio Management	Class Module	

Please click on the link provided in STAGE column to access the files