MTRN4230 Robotics ASSIGNMENT 1

AIMS

1. Read and understand safety documents for operating robots
2. Online training with UR5e
3. Offline configuration of UR5e by use of virtual machine

DUE DATE

Assessment criteria	***Due date and submission requirements***	***Deadline for absolute fail***	***Marks returned***
Upload completed assignment + code	*Week 2: 11:59pm, Friday via Teams*	*Week3:11:59pm, Wed.*	*1 week after submission*

GETTING STARTED

1. Download attached documents and files
2. Create account in universal robotics
3. Install virtual box
4. Import virtual image given for UR5e

Note (xx) is used to show you how much point you receive answering that question. For example if it's (0.5) it means 0.5 percent you receive.

ACTIVITIES

1. SAFETY QA

Read the following document and answer to the below

- **UR5e User Manual:** https://s3-eu-west-1.amazonaws.com/ur-support-site/50557/UR5e_User_Manual_en_Global.pdf

Questions

a. Explain the steps in "Pre-Use Assessment"? (0.5)
b. Shortlist integrator role in this document? (0.5)
c. Summary modes in the robot? (0.5)

- Read ENG-MECH-RMF-15979 and ENG-MECH-SWP-8948 https://safesys.unsw.edu.au/hs/Lists/healthsafetyforms/DispForm.aspx?ID=16091, https://safesys.unsw.edu.au/hs/Lists/healthsafetyforms/DispForm.aspx?ID=16090

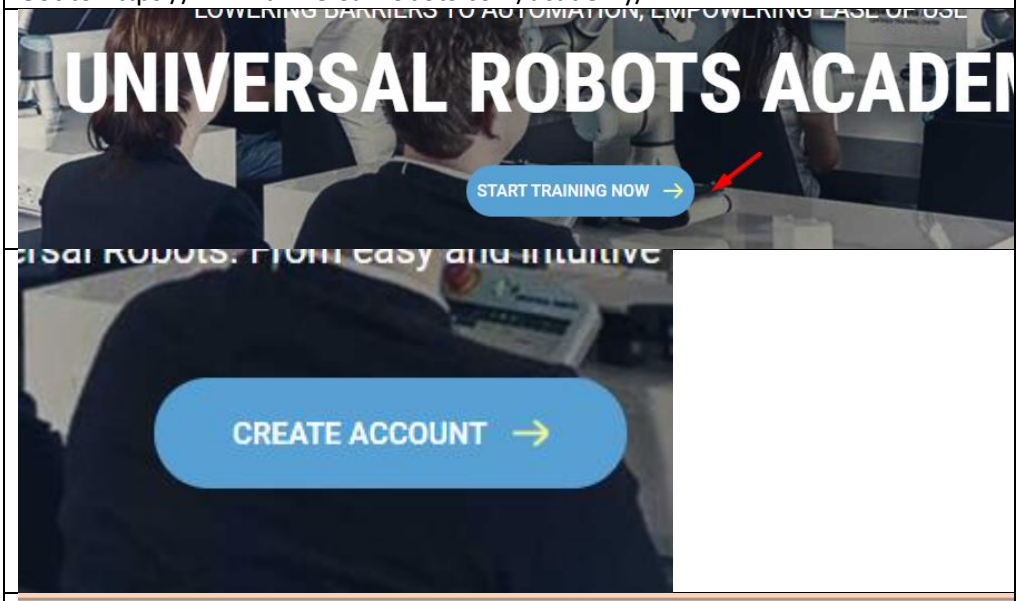
d. Explain Start Up and Operation(0.5)
e. Explain Hazard/Task "Robot tool causing damage to user or equipment" (0.5)
f. Explain Shutting Down(0.5)

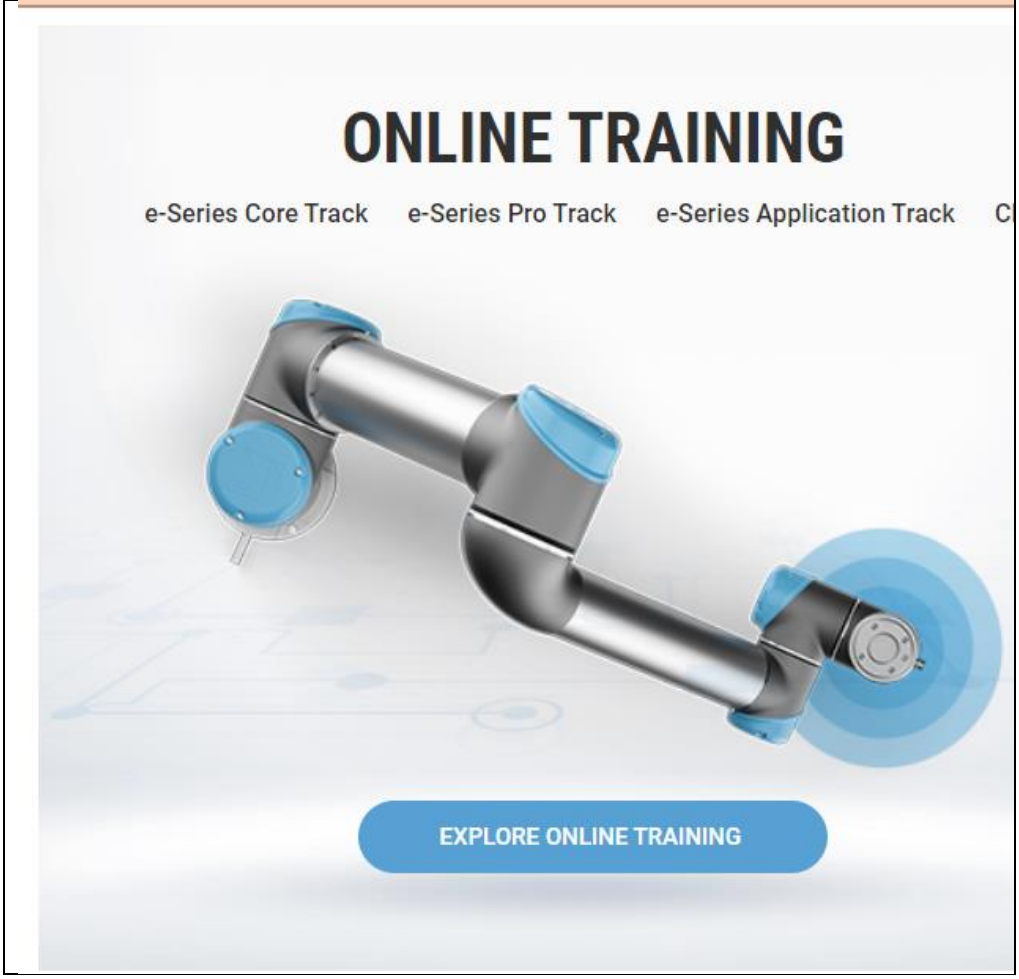
Dr. Javad Taghia, UNSW Australia
j.taghia@unsw.edu.au
version 20.2.0

2. ONLINE UR5 TRAINING

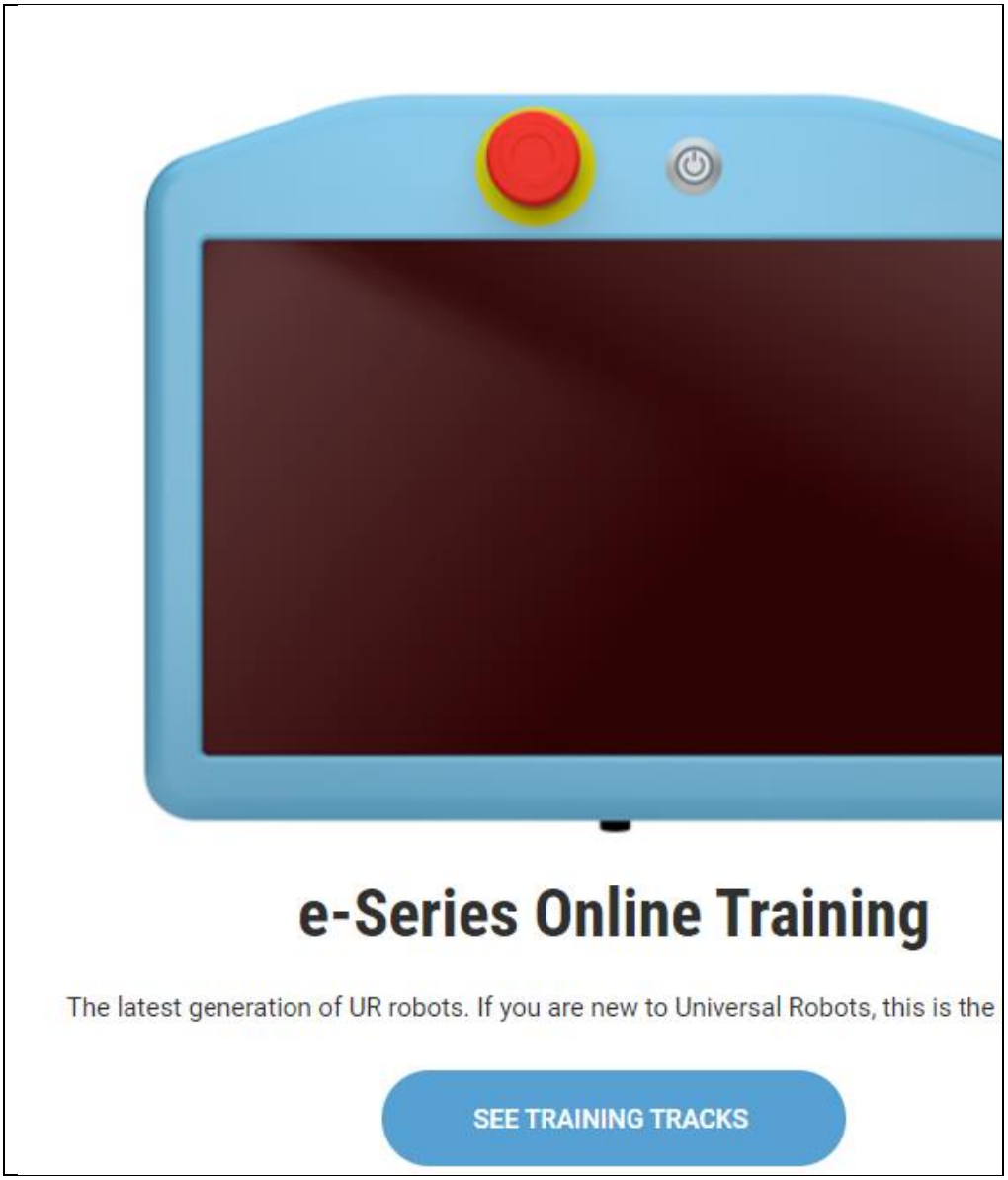
a. Follow the below steps and upload the certificate as a part of deliverables for this assignment

Got to https://www.universal-robots.com/academy/





Dr. Javad Taghia, UNSW Australia
j.taghia@unsw.edu.au



Dr. Javad Taghia, UNSW Australia
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e-Series Core Track

The Core Track teaches all essential concepts, terminology and programming commands needed to operate a UR robot. The 8 modules are a step-by-step simulation of setting up and programmi a complete pick-and-place application.

SEE TRAINING MODULES

Upload the certificate you received

3. OFFLINE UR5 PRGRAMMING

Install virtual box
Import URSim_VIRTUAL-5.7.0.90932
Take snapshot of the setup you do on your robot and attach it to your report.

Dr. Javad Taghia, UNSW Australia
j.taghia@unsw.edu.au

1. How much is maximum "Active Payload" for UR5? Set it to 15. (0.52)
2. Set
    a. the tool Position to X = 5.1cm, Y= 6.2cm,Z = 0.9cm (0.25)
    b. the tool orientation to RX = 42, RY 32, Rz 30 (0.25)
    c. Centre of gravity to X = 50mm, Y=60mm, Z = 70mm (0.25)
3. Add two digital inputs and name them in1 and in2. Connect in1 to Auto-init and in2 to Stop-Prog. (0.25)
4. Conveyor Tracking to be set to Conveyor1, Encoder Type incremental and conveyor type as Circular (0.25)
5. Set the communication baud rate to 115200 (0.25)
6. Set the home position to Base -247, Shoulder 78, Elbow -87 and Wrist 1 to -151, Wrist 2 to 141 and Wrist 3 to -145 (0. 25)
7. Create a safety plane named Plane 1 based on Feature Base with restrictions as Normal and Displacement of 12. Note it's a Restrict Elbow. (3)

Hint: you need to set safety password before doing this task.

MARKING CRITERIA

Overall mark for this item is 10%. It has been distributed as below

Safety QA	3%	Every question 0.5% mark
Online UR5 training	2%	Certificate to be uploaded
Offline UR5 programming	5%	Screen shots to be submitted

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