The University of Western Australia
School of Engineering
Associate Lecturer Kieran Quirke-Brown

Robot Manipulators and Automation
AUTO4507

Group Project	**Drawing Robot Manipulator**	**weeks 6-12**

GROUPS: Form groups of 2 students

EQUIPMENT: TTGO controller

Design and build a parallel pick and place robot that can hold a pen/pencil/marker and draw out shapes.

- Build the parallel arm robot from 3D-printed or laser-cut parts.
  Consider signing up for the Makers Club (requires inductions).
- Each of the 3 arms should be actuated by a motor, which is controlled by a TTGO ESP32 controller (provided).
- The robot needs to be able to draw at least a square, triangle and a circle.
- Write a program on the TTGO to display the key metrics of each arm.
- With forward-kinematics calculate and display the end effector position in x,y,z.
- Visualise the path plan of the robot on your laptop before running it.
- Your robot should be accessible via WIFI with a gui to select desired shape.

BUDGET
The maximum budget for this project is $50 per group.
You will need to get a reimbursement through concur, details to be provided at a later date.

DEMONSTRATION
During your lab session in week 12.

VIDEO
Produce a video of about 1 min. length using time-lapse that shows the full construction of your robot and include your design choices.

SUBMISSION
Submit one report per team as a softcopy plus hardcopy with official coversheet incl. declarations of all team members:

1. Project design report (*pdf*), which includes:
   - Report on which team member did what
   - CAD design
   - Software design
   - Diagrams, photos, screenshots, plots, etc.
   - Bill of Material with costing (budget)
   - User Manual

   Include page numbers; max 10 pages plus 1 Title page

   Do NOT include:
   o Program code
   o Table of contents, etc.

2. Source code *(email to project supervisor only, no hardcopy)*, clearly marking any imported code with referencing the source.

MARKING
60%   Functional Performance, Design, Complexity, Innovation
30%   Project Design Report
10%   Video