**A. Group name: To build a 3d printed robot arm with 500mm reach and max. 1kg payload.**

**B. Objective:**

**C. Characteristics:**

1. Candidate must be present physically at the CoEAMT.

2. He / She must have a basic knowledge on Solidworks or any designing tool.

3. We will provide the existing design model and specification of the motor. With 3d Printing filament for the fabrication

**D. Week-wise activity plan:**

Week-1: Understanding of industrial robot architecture and learning of any designing tool (Solidworks, Autodesk etc.)

Week-2: The existing robot design has to be scaled down which includes motor fitment, robot joint mechanism and inclusive of harmonic drive arrangement.

Week-3: Motion analysis and and simulating the manipulation of the modified robot.

Week-4,5& 6: After finalizing the designed robot (with different linkages, and small component), all the parts have to be printed in the 3d printing one by one.

Week-7: All the assembly material (BOM) has to be finalized and discuss with scholar mentors to arrange the screws, belts, pulley, coupling etc.

Week-8: Assembly of the robot linkages and joint mechanism

**Reference links:**

[**https://www.youtube.com/watch?v=cENGt6ogVRM&ab\_channel=RoboticacolaborativaMKS**](https://www.youtube.com/watch?v=cENGt6ogVRM&ab_channel=RoboticacolaborativaMKS)

[**https://www.youtube.com/watch?v=X-j84RwymAU&ab\_channel=RoboticacolaborativaMKS**](https://www.youtube.com/watch?v=X-j84RwymAU&ab_channel=RoboticacolaborativaMKS)

[**https://www.youtube.com/watch?v=cod\_SNq-d6c&ab\_channel=KrisTemmerman**](https://www.youtube.com/watch?v=cod_SNq-d6c&ab_channel=KrisTemmerman)

[**https://skill-lync.com/student-projects/design-of-robotic-arm**](https://skill-lync.com/student-projects/design-of-robotic-arm)

[**https://www.intel.in/content/www/in/en/robotics/robotic-arm.html**](https://www.intel.in/content/www/in/en/robotics/robotic-arm.html)

[**https://www.youtube.com/watch?v=hV3Ha0bWDgI**](https://www.youtube.com/watch?v=hV3Ha0bWDgI)

=== END of Problem Statement # 11 ===

**Problem Statement # 12**

**A. Group name: To build a 3d printed robot arm with 500mm reach and max. 1kg payload for robot actuation (electronics design).**

**B. Objective:**

**C. Characteristics:**

1. Candidate must be present physically at the CoEAMT.

2. He / She must have a basic knowledge on electronic servo motor control.

3. We will provide the existing motor and driver to connect and test.

4. This group has to be communicated with the robot fabrication group (PS no:11)

**D. Week-wise activity plan:**

Week-1 & 2: Study about the robot controller actuation and explore various servo motors, controllers and sensors for robot motor and controller wiring.

Week-3 & 4: Designing of the connection diagram for the robot motor and controller schematic.

Week-5 & 6: With the existing motor (if required additional motor) and controller has to be programmed and tested.

Week-7 & 8: Motor motion has to be analyzed as per the control algorithm.

Week- 9: Testing on the actual robot arm.

Week-10: Report writing.

**Reference links:**

[**https://www.youtube.com/watch?v=cENGt6ogVRM&ab\_channel=RoboticacolaborativaMKS**](https://www.youtube.com/watch?v=cENGt6ogVRM&ab_channel=RoboticacolaborativaMKS)

[**https://www.youtube.com/watch?v=X-j84RwymAU&ab\_channel=RoboticacolaborativaMKS**](https://www.youtube.com/watch?v=X-j84RwymAU&ab_channel=RoboticacolaborativaMKS)

[**https://www.youtube.com/watch?v=cod\_SNq-d6c&ab\_channel=KrisTemmerman**](https://www.youtube.com/watch?v=cod_SNq-d6c&ab_channel=KrisTemmerman)

[**https://skill-lync.com/student-projects/design-of-robotic-arm**](https://skill-lync.com/student-projects/design-of-robotic-arm)

[**https://www.intel.in/content/www/in/en/robotics/robotic-arm.html**](https://www.intel.in/content/www/in/en/robotics/robotic-arm.html)

[**https://www.youtube.com/watch?v=hV3Ha0bWDgI**](https://www.youtube.com/watch?v=hV3Ha0bWDgI)

=== END of Problem Statement # 12 ===

**Problem Statement # 13**

**A. Group name: Robot control algorithm for the designed robot**

**B. Objective:**

**C. Characteristics:**

1. Candidate may be in online/offline mode at the CoEAMT.

2. He / She must have a basic knowledge on robotic model development in MATLAB.

3. We will provide the existing motor and driver to connect and test. With the developed algorithm.

**D. Week-wise activity plan:**

Week-1&2: Study about the robot controller actuation and explore the controllers, different control algorithm such as kinematics, dynamics, singularity and redundancy and use of FT sensors for robot joint movement.

Week-3&4: Explore the control algorithm and motor-driver integration from the control algorithm.

Week-5&6: Develop the kinematics and dynamics approach algorithm in MATLAB.

Week-7&8: Integrate with the developed robot and test.

Week-9: The singularity and redundancy have to be checked and analysed as per the algorithm and if required modification will be required as per the requirement.

**Reference links:**

[**https://www.youtube.com/watch?v=cENGt6ogVRM&ab\_channel=RoboticacolaborativaMKS**](https://www.youtube.com/watch?v=cENGt6ogVRM&ab_channel=RoboticacolaborativaMKS)

[**https://www.youtube.com/watch?v=X-j84RwymAU&ab\_channel=RoboticacolaborativaMKS**](https://www.youtube.com/watch?v=X-j84RwymAU&ab_channel=RoboticacolaborativaMKS)

[**https://www.youtube.com/watch?v=cod\_SNq-d6c&ab\_channel=KrisTemmerman**](https://www.youtube.com/watch?v=cod_SNq-d6c&ab_channel=KrisTemmerman)

[**https://skill-lync.com/student-projects/design-of-robotic-arm**](https://skill-lync.com/student-projects/design-of-robotic-arm)

[**https://www.intel.in/content/www/in/en/robotics/robotic-arm.html**](https://www.intel.in/content/www/in/en/robotics/robotic-arm.html)

[**https://www.youtube.com/watch?v=hV3Ha0bWDgI**](https://www.youtube.com/watch?v=hV3Ha0bWDgI)

=== END of Problem Statement # 13 ===