

DEPARTMENT OF ELECTRICAL ENGINEERING  
INDIAN INSTITUTE OF ENGINEERING SCIENCE AND TECHNOLOGY,  
SHIBPUR, HOWRAH-711 103.

No. 17/2019/EE-3/21(PBC)

Dated: 21/01/2019

*From:* The Head of the Department,  
Electrical Engineering,  
IEST, Shibpur, Howrah-711 103

*To:* Enlisted vendors of the institute and other interested parties/ For Website Tender.

Dear Sir(s),

Sealed quotations are invited for supply of the following item(s) within **15 days** from the date of publication of this advertisement in the website. The quotation should include the 5% GST only as per institute rule, delivery charges, entry tax if any, etc. to Department of Electrical Engineering, Indian Institute of Engineering Science and Technology, Shibpur and should mention a firm delivery period. Preferences will be given to the suppliers who can supply ex-stock.

The vendors, who are not enlisted in the Institute register, should submit the copies of their valid Trade License, GST registration, PAN, latest Income Tax / Sales Tax Statement /Return, SSI/MSME certificate, if any etc. and any other commercial credentials. The institute will provide concessional GST rate certificate with the purchase order and will pay 5% GST only.

*Yours faithfully,*



Signature of the indenting Officer/  
Concerned Faculty Member

*Prof. & Head of EE Dept.*  
IEST, Shibpur, Howrah – 711 103

**List of Items/Tasks:**

**CML#1 : Designing and 3D printing of the 3-link robotic arm, along with drivers and sensors** with following specifications:

1. **3D CAD Modelling of a 6-DOF Robotic Arm:** -Design, Simulation and Delivery of an accurate and complete 3D CAD model of a custom-designed serial-link 6-DOF Robotic Arm from the design specifications given (along with a tabulation of the values of all important mechanical parameters, including inertia of each link).The CAD model must be compatible with SOLIDWORKS® and translatable to equivalent Simscape™ Multibody™ blocks to be used in Simulink, MATLAB.
2. **Manufacturing the Robot Arm :( 1 unit):-** Manufacturing and assembling of all the mechanical parts of the robot arm designed in serial no.1 using Aluminum as the choice of raw material. The outer body of the arm must be electrically insulated.

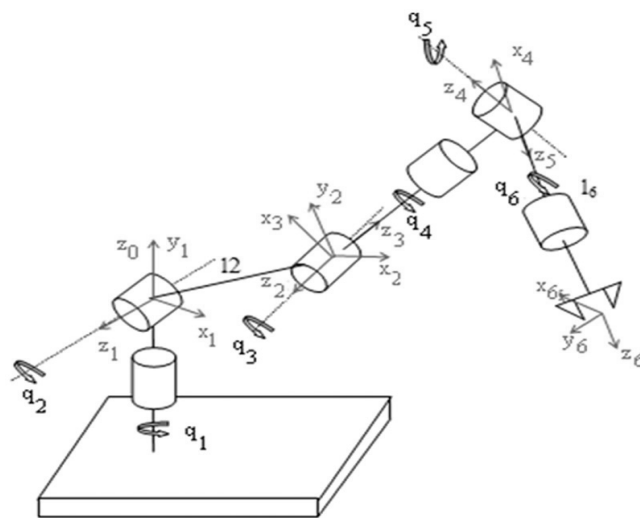
3. **Procuring and assembling all important electrical accessories for the robotic arm and its Installation:** Selection of proper joint angle sensor, motor and driver circuit for each joint actuator (to achieve optimum performance and power utilization) and installing them in the robotic arm (manufactured in serial no.2) followed by rigorous testing. Preparing a local power delivery system to feed all actuators and all the other associated circuits from a standard off-the-shelf DC24V, 4A/6A power adapter as the only source of power. Finally providing a compact signal processing, data conversion (A/D) and digital interface circuitry in an insulated enclosure to connect the actuators and sensors of the robotic arm with standard digital hardware platforms like PC, Raspberry Pi or other equivalent SBCs via both wired (USB, I2C) and wireless medium (Wi-Fi) for testing control algorithms in Hardware-in-the-Loop (HIL) Simulations. The necessary firmware must be installed in the hardware and the useful APIs must be provided for programming.

**Summarized manufacturing specification list is given below, for further details the vendor may contact with the indenting professor.**

Robot Specification:-

Technical Field	Value/Description/Remarks
Construction Outline	Stable and attachable/detachable pedestal for vertical mounting on tabletops, three serial links and one two-fingered claw type arm gripper as end-effector, all connected and driven by electrical joint actuators (total six in number).
Type	Articulated Robot Arm with all revolute joints
Total Degrees of Freedom (DoF)	6
Maximum Vertical Reach	700 mm
Maximum Horizontal reach	600 mm
Maximum Payload	2 Kg
Repeatability	$\pm 0.2$ mm
Max joint Speed (All joints)	$\pm 180^\circ / \text{sec}$
Gripper opening	100 mm
Protection	IP54 for Robot Arm and IP55 for Interfacing Module
Working Temperature Range	0-50°C

A schematic of a robotic arm with very similar characteristics with the proposed robotic arm is shown below, depicting only its co-ordinate system for understanding the kinematics and working.



**Warranty requirements: 2 years**