

**University of Engineering and Technology Lahore, Faisalabad Campus**

**Department of Mechanical, Manufacturing, and Mechatronics Engineering**

**Subject:** Allotment of Budget for Inverted Pendulum and Cart Model

Respectable sir,

The inverted pendulum and cart model's apparatus was allotted to me and my task is to improve the model so that it can be used in the lab of subject "MCT-431L Control System-II" as lab apparatus. The improvement and modifications are related to the design of the control system for the inverted pendulum and cart model. The end result of these modifications and improvements will be a properly controlled working model of the cart and pendulum model which can be used as an experimental apparatus in the control systems lab. For necessary improvement and redesigning of model I have to use some additional components along with the previous ones, I have attached the components list with the application. It is being requested to allot the budget for the required components. So that I can redesign the system according to the requirements. I assure you that my team and I will work hard to meet the desired objectives.

I shall be very thankful to you.

Yours Obediently,

Sabir Husnain

Reg. 2019-MC-263

Applicant Signature: \_\_\_\_\_

Supervisor Signature: \_\_\_\_\_

Dated: November \_\_\_\_, 2022.

## Required Components & Budget

Sr. No.	Name	Amount Required	Price/ Piece	Total Price	Online Availability	Offline Availability	
1.	8mm Horizontal Linear Bearings	2	250	500	<a href="https://electrobes.com/product/kfl08-8mm-t8-horizontal-linear-bearing-bracket-screw-pillow-blocks-for-cnc/">https://electrobes.com/product/kfl08-8mm-t8-horizontal-linear-bearing-bracket-screw-pillow-blocks-for-cnc/</a>	Islamabad	
2.	ESP32 Controller	1	1050	1050	<a href="https://electrobes.com/product/esp32-wroom-32-38-pins-wifiblueetooth-mcu-module/">https://electrobes.com/product/esp32-wroom-32-38-pins-wifiblueetooth-mcu-module/</a>	Islamabad, Lahore	
3.	MPU9250 (IMU Sensor)	1	950	950	<a href="https://electrobes.com/product/mpu9250-9-axis-9dof-accelerometer-gyroscope-compass-module/">https://electrobes.com/product/mpu9250-9-axis-9dof-accelerometer-gyroscope-compass-module/</a>	Islamabad, Lahore	
4.	8mm-8mm Shaft Coupler	1	220	220	<a href="https://electrobes.com/product/8mm8mm25mm-3d-printer-stepper-motor-fixed-coupler/">https://electrobes.com/product/8mm8mm25mm-3d-printer-stepper-motor-fixed-coupler/</a>	Islamabad, Lahore	
5.	8mm Linear Rail Shaft (400mm)	1	580	580	<a href="https://electrobes.com/product/5mm-8mm-10mm-12mm-linear-rail-shaft-smooth-rod-for-cnc-machine-and-3d-printer/?attribute_pa_diameter=8mm&amp;attribute_pa_length=400mm">https://electrobes.com/product/5mm-8mm-10mm-12mm-linear-rail-shaft-smooth-rod-for-cnc-machine-and-3d-printer/?attribute_pa_diameter=8mm&amp;attribute_pa_length=400mm</a>	Islamabad, Lahore	
6.	8mm Linear Rail Shaft (250mm)	1	380	380	<a href="https://electrobes.com/product/5mm-8mm-10mm-12mm-linear-rail-shaft-smooth-rod-for-cnc-machine-and-3d-printer/?attribute_pa_diameter=8mm&amp;attribute_pa_length=250mm">https://electrobes.com/product/5mm-8mm-10mm-12mm-linear-rail-shaft-smooth-rod-for-cnc-machine-and-3d-printer/?attribute_pa_diameter=8mm&amp;attribute_pa_length=250mm</a>	Islamabad, Lahore	
7.	Hole to Hole Jumpers	1	130	130	<a href="https://electrobes.com/product/hole-to-hole-40-jumper-wires-strip/?attribute_pa_jwire-length=20cm">https://electrobes.com/product/hole-to-hole-40-jumper-wires-strip/?attribute_pa_jwire-length=20cm</a>	Islamabad, Lahore	
8.	2 Core Twisted Wire	1	40	40	<a href="https://electrobes.com/product/1-meter-2-core-twisted-hard-jumper-wires-cable/">https://electrobes.com/product/1-meter-2-core-twisted-hard-jumper-wires-cable/</a>	Islamabad, Lahore	
9.	Close Timing Belt	2	290	580	<a href="https://epro.pk/product/closed-loop-rubber-timing-belt-for-2gt-6mm/?attribute_size=200">https://epro.pk/product/closed-loop-rubber-timing-belt-for-2gt-6mm/?attribute_size=200</a>	Lahore	
10.	Open Timing Belt & 20 Teeth Timing Pulleys (8mm Bore)	1	950	950	<a href="https://hallroad.org/20t-8mm-gt2-pulley-and-2m-belt-in-pakistan.html">https://hallroad.org/20t-8mm-gt2-pulley-and-2m-belt-in-pakistan.html</a>	Lahore	
11.	40 Teeth Timing Pulleys (8mm Bore)	2	508	1016	<a href="https://www.daraz.pk//products/i268812663-s1483029222.html?spm=a2a0e.cart.0.0.60637d68K9VyDE&amp;urlFlag=true">https://www.daraz.pk//products/i268812663-s1483029222.html?spm=a2a0e.cart.0.0.60637d68K9VyDE&amp;urlFlag=true</a>	Unavailable	
12.	Carbon Wound Pot (1k)	1	150	150	<a href="https://hallroad.org/1w-single-turn-rotary-taper-carbon-wire-wound-potentiometer-volum-resistor.html">https://hallroad.org/1w-single-turn-rotary-taper-carbon-wire-wound-potentiometer-volum-resistor.html</a>	Lahore	
13.	DC Motor Driver	1	350	350	<a href="https://electrobes.com/product/l298n-h-bridge-motor-driver-module/">https://electrobes.com/product/l298n-h-bridge-motor-driver-module/</a>	Islamabad, Lahore	
Delivery Chargers		electrobes		epro		daraz.pk	hallroad.org
		300		280		120	200
Total		7796					