

**ERASMUS +**

**CAPACITY BUILDING IN THE FIELD OF HIGHER EDUCATION**

**Erasmus+ Project**

Modernization of Mechatronics and Robotics for Bachelor degree in Uzbekistan through Innovative Ideas and Digital Technology   
(MechaUz)

**Invitation to Tender for Equipment Procurement –**

**Mechatronics and Robotics LAB**

**(Uzbekistan)**

#MECHAUZ2020

Dear Sir/Madam,

We kindly invite you to submit your **tender documents for the supply of Equipment to the Mechatronics and Robotics LAB in Tashkent University of Information Technologies (TUIT)** (see the technical specifications provided in the Annex 2) within the framework of the Project *“Modernization of Mechatronics and Robotics for Bachelor degree in Uzbekistan through Innovative Ideas and Digital Technology”* – MechaUz, co-funded by the **ERASMUS+ Programme of the European Union**.

When preparing your tender documents, please be guided by the invitation to tender.

Tenders should be submitted in English **by Email** to[mechauz.2020@gmail.com](mailto:mechauz.2020@gmail.com) not later than **25.09.2020** (Tashkent local time).

We kindly ask you to ensure that the tender is **signed, stamped, and in the PDF format**. An acknowledgement of receipt will be sent to you accordingly.

In all cases, please add the below reference: #MECHAUZ2020 “Invitation to Tender for Mechatronics and Robotics LAB in Tashkent University of Information Technologies (Uzbekistan)”.

*For any additional information, please, contact us* ***only*** *by Email.*

Dr. Utkir Khamdamov

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Tashkent city,

Uzbekistan

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# Annex 1: Company Information Sheet

#MECHAUZ2020 “Invitation to Tender for Equipment Procurement –  
Mechatronics and Robotics LAB in Tashkent University of Information Technologies (Uzbekistan)”

*Please, fill in all fields.*

|  |  |  |
| --- | --- | --- |
| **Bidder’s Information** | | |
| **Company legal name** |  |
| **Company legal address** |  |
| **Company E-Mail** |  |
| **Company authorized representative**  (name, address, telephone number(s), fax number(s) and  e-mail address) |  |
| **Attached are copies of the following documents:**   * A photocopy of the trade name registration papers | |

# Annex 2: Equipment Description

#MECHAUZ2020 “Invitation to Tender for Equipment Procurement – Mechatronics and Robotics LAB in Tashkent University of Information Technologies (Uzbekistan)”

*Please, fill in all fields.*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Mechatronics and Robotics LAB: //The table of equipment required for TUIT** | | | | |
| **#** | | **Required Technical Specifications and Standards** | | **Quantity** |
| ***#1C*** | | ***NI ELVIS III*** | | ***3 pcs*** |
| **1** | | **Oscilloscope:**   * 4 ch * 400 MS/s * 14 bits | |  |
| **2** | | **Function Generator:**   * 2 ch * 100 MS/s * 15 MHz, * 14 bits | |  |
| **3** | | **Logic Analyzer/Pattern Generator:**   * 16 ch, * 100 MS/s | |  |
| **4** | | **IV Analyzer:**   * ±10 V * ±30 mA * 5 MHz | |  |
| **5** | | **Digital Multimeter:**   * 4½ digits | |  |
| **6** | | **Variable Power Supply:**   * ±15 V * 500 mA | |  |
| **7** | | **AI/AO:**   * 16 ch, 16 bits/4 ch, 16 bits | |  |
| **8** | | **DIO:**   * 40 ch | |  |
| **9** | | **SFP Support:**   * Windows | |  |
| ***#2C*** | | ***NI ELVIS III Cables & Probes*** | | ***3 pcs*** |
|  | |  | |  |
|  | | | | |
| ***#3C*** | | ***NI ELIVS III Power Cord*** | | ***3 pcs*** |
|  | |  | |  |
|  | | | | |
| ***#4C*** | | ***Quanser Mechatronics Sensors Board for NI ELVIS III*** | | ***1 pc*** |
| **1** | | **Key features:**   * 11 Sensors * Ready to use * Easy Operation * Accelerate Discovery | |  |
| **2** | | **Courseware:**   * Sensor behaviour * Filtering and statistical analysis of raw sensor data * Deflection and natural frequency measurement using strain gage * Pressure transducer calibration * Angular displacement measurement * Encoder decoding * Long and mid-range distance measurement * Proximity detection * Switch debouncing * Temperature calibration and measurement * Capacitive touch sensing * Roll, pitch, and yaw measurements using an IMU | |  |
|  | | | | |
| ***#5C*** | | **Quanser Mechatronics Actuators Board for NI ELVIS III** | | ***1 pcs*** |
| **1** | | **Key features:**   * Four Complete Actuator Systems * Open and Customizable * Comprehensive Courseware * Accelerate Discovery | |  |
| **2** | | **Courseware:**   * DC Motors: Brushed DC motors, brushless DC motors, design considerations * Power Amplifiers: Linear power amplifiers, pulse width modulation amplifier, design considerations * Position Controlled Actuators: Stepper motors, servomechanical actuators, design considerations | |  |
|  | | | | |
| ***#6C*** | ***Quanser Mechatronics Systems Board for NI ELVIS III*** | | ***1 pc*** | |
| **1** | **Key features:**   * Complete System * Open and Customizable * Comprehensive Courseware * Accelerate Discovery | |  | |
| **2** | **Courseware:**   * Manipulator Control: Motor interfacing, forward and inverse kinematics, PID motor control * Processing Images: Image thresholding, blob detection, pattern matching * System Level Control: State machines, task-space control, goal directed line following | |  | |
|  | | | | |
| ***#7C*** | ***Quanser Controls Board for NI ELVIS III*** | | ***1 pc*** | |
| **1** | **Key features:**   * Highly Linear Motor Response * Open and Customizable * Complete Package * Simulink® Compatibility | |  | |
| **2** | **Courseware:**   * DC Motor Modelling: First principles, experimental, frequency * Speed Control: PID control, lead compensators * Position Control: PID control, steady-state error * Stability: BIBO, Nyquist, Routh Hurwitz * Inverted Pendulum Control: Pole placement, LQR, swing-up * Digital Control: Quantization, matched pole-zero, digital design | |  | |
|  | | | | |
| ***#8C*** | ***Digilent Digital Electronics for NI ELVIS III*** | | ***3 pcs*** | |
| **1** | **Specifications:**   * Digital electronics teaching platform * Programmable with Multisim, LabVIEW, and Vivado * Integrates with NI ELVIS III * Zynq XC7Z020 FPGA | |  | |
| **2** | **Peripherals:**   * Audio codec in and out jacks * Headphone and microphone jacks * VGA and HDMI connector * Ethernet connector * MicroSD port * 8 LEDs, 8 slide switches, 4 push buttons * 3 PMOD connectors * Expansion connector * Capacitive touchscreen * OLED 12 × 32 monochrome display * 4-digits 7-segments LEDs * Expansion connector * Breadboard | |  | |
| **3** | **NI ELVIS Integrations:**   * 2 and 8 channel oscilloscope * Bode plotter * Digital multi-meter (DMM) * Function generator * Arbitrary waveform generator * Octave analyser * Digital reader/writer * Dynamic signal analyser * Digital waveform viewer * Variable supply * Audio Equalizer * Impedance analyser * DC level * Data logger * 2 and 3 wire current-voltage analyzer | |  | |
|  | | | | |

# Annex 3: Commercial Offer

Note –

*The Company must accomplish the commercial offer for equipment on its letterhead clearly showing the companies complete name and address.*

To: The Rector of TUIT

Prof. Tulkin Teshabaev

|  |
| --- |
| ***Commercial offer for the equipment supply within the framework of the project***  ***Modernization of Mechatronics and Robotics for Bachelor degree in Uzbekistan through Innovative Ideas and Digital Technology  (MechaUz)***  #MECHAUZ2020 “Invitation to Tender for Equipment Procurement – Mechatronics and Robotics LAB in Tashkent University of Information Technologies (Uzbekistan)” |

Name of Company \_\_ **\_\_\_\_\_\_\_\_\_**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Mechatronics and Robotics LAB**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Item** | **Description** | **Quantity**  **(pcs) for 1 University** | **Unit Price (EUR)** | **Total Price per item (EUR) for 1 University** |
| **1** | **2** | **4** | **5** | **6=4 х 5** |
| #1C | NI ELVIS III | 3 |  |  |
| #2C | NI ELVIS III Cables & Probes | 3 |  |  |
| #3C | NI ELIVS III Power Cord | 3 |  |  |
| #4C | Quanser Mechatronics Sensors Board for NI ELVIS III | 1 |  |  |
| #5C | Quanser Mechatronics Actuators Board for NI ELVIS III | 1 |  |  |
| #6C | Quanser Mechatronics Systems Board for NI ELVIS III | 1 |  |  |
| #7C | Quanser Controls Board for NI ELVIS III | 1 |  |  |
| #8C | Digilent Digital Electronics for NI ELVIS III | 3 |  |  |
| **Total Amount (Euro) excluding VAT** | | | |  |

Total amount in words: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

If there is a discrepancy between words and figures, the amount in words shall prevail

Warranty conditions:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Delivery conditions:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Delivery period:

\_\_\_\_\_\_ Days from the date of signature of the contract

Name

In the capacity of

Signed

Duly authorized to sign the company for and on behalf of

Date

Stamp