

ADVT. for Tender Notice

**Institute Website**

**CENTER FOR HEALTHCARE SCIENCE & TECHNOLOGY**  
Indian Institute of Engineering Science and Technology, Shibpur; Howrah-711103

Web Tender Advt. No: CHST/Web/D/4

Dated: 27.12.2017

Sealed tenders are invited by the Centre for Healthcare Science & Technology, Indian Institute of Engineering Science and Technology, Shibpur, Howrah-711103 for the supply of laboratory items/works.

Tender Documents containing details of the items and terms and conditions may be downloaded from the university website and completed bidding documents are to be submitted to the **Head, Centre for Healthcare Science & Technology, Indian Institute of Engineering Science and Technology, Shibpur; Howrah-711103** or dropped into the Tender Box kept in the Center **within ten working days of publishing the tender.**

Enclosed: **Specification of the Items.**

*Prof. Amit Roy Chowdhury*  
*Head,*  
*Centre for Healthcare Science and Technology*

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**Specification of the items:**

Instrument	Specifications
<b><u>Op-Amp Trainer</u></b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Covers Op-Amp (741) &amp; its various applications</li> <li><input type="checkbox"/> Allows study of timer using 555 IC</li> <li><input type="checkbox"/> Study of F/ V, V/ F using LM331</li> <li><input type="checkbox"/> On-board Resistor, Capacitor, Diode and Potentiometer bank of different values. <input type="checkbox"/> Bread board area allows construction of circuits using external components along with on board resources.</li> <li><input type="checkbox"/> On-board fixed power supply and variable regulated positive and negative power supply.</li> <li><input type="checkbox"/> ±15V, ±12 and +5V fixed DC power supply</li> <li><input type="checkbox"/> DC 1.5 to 10V, -1.5 to -10V variable power supply</li> <li><input type="checkbox"/> IC 741 Op-Amp stage <input type="checkbox"/> 555 IC stage <input type="checkbox"/> LM331 IC stage. <input type="checkbox"/> 16 pin ZIF socket <input type="checkbox"/> Resistor bank</li> <li><input type="checkbox"/> Capacitor bank <input type="checkbox"/> Potentiometers <input type="checkbox"/> Diodes <input type="checkbox"/> Zener diodes</li> <li><input type="checkbox"/> NPN Transistor <input type="checkbox"/> N-channel MOSFET <input type="checkbox"/> LED <input type="checkbox"/> Bread board</li> </ul>
<b><i>ZIGBEE Trainer Kit</i></b>	<ul style="list-style-type: none"> <li>• Integrated 2.4GHz, IEEE 802.15.4-compliant transceiver</li> <li>• Integrated Chip Antenna.</li> <li>• 13 GPIOs(General Purpose Input/outputs) are available</li> <li>• 3 GPIOs for Analog Inputs: On board Temperature, LDR sensor and Variable voltage source for ADC.</li> <li>• 10 GPIOs for Digital Inputs/Outputs: On board Buzzer, 3 sliding switches, 3 Output LEDs, Relay, Status and Power LEDs</li> <li>• USB A-B interfacing facility with PC</li> <li>• User friendly GUI for accessing the ZigBee Modules.</li> <li>• Transmit Power: +20dBmE.I.R.P (max.)</li> <li>• RF Data Range: 250 kbps</li> <li>• Power Supply: +5VD.C. ~0.5 Amp. min.</li> <li>• OS Support: XP/Vista/Windows-7</li> </ul> <p><b>On Board Peripherals:</b></p> <p><b>Relay</b></p> <ul style="list-style-type: none"> <li>• 5V SPDT Mechanical Relay</li> <li>• NO &amp; NC LED indicator</li> <li>• Screw Terminal Connector for connecting external devices</li> </ul> <p><b>Buzzer</b></p> <ul style="list-style-type: none"> <li>• Operating Voltage: 3-6V DC</li> <li>• Tone Type: Single</li> </ul> <p><b>LDR</b></p> <ul style="list-style-type: none"> <li>• Light luminance: 0-300 Lux</li> </ul> <p><b>Temperature Sensor</b></p> <ul style="list-style-type: none"> <li>• Operating Temperature range: 0°C -120°C</li> <li>• Scale Factor: 10 mV/°C</li> </ul> <p><b>Switch &amp; LED</b></p> <ul style="list-style-type: none"> <li>• Three SMD output LEDs.</li> <li>• Two SMD Switch for RESET &amp; FACTORY RESET of ZigBEE MODULE</li> <li>• Three Toggle Slider Switches for applying inputs</li> </ul>
<b><u>Wi-Fi TRAINER</u></b>	<b>WI-FI Tran receiver module with 16Bit microcontroller Transceiver</b>

<p><b><u>KIT</u></b></p>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Integrated 2.4GHz, IEEE 802.11-compliant RF transceiver</li> <li><input type="checkbox"/> Data rate: 1 to 11 Mbps for 802.11b / 6 to 54 Mbps for 802.11g, Integrated PCB antenna</li> <li><b>16 Bit Microcontroller: PIC24FJ256GB206</b></li> <li><input type="checkbox"/> Integrated RTC 32,768 KHz quartz onboard</li> <li><input type="checkbox"/> Communication : up to 4 UARTs, SPI, I2C</li> <li><input type="checkbox"/> Flash : 16 Mbit &amp; EEPROM : 64 Kbit</li> <li><b>USB interface communication cable with PC</b></li> <li><input type="checkbox"/> USB to RS232 Converter : FT232RL</li> <li><input type="checkbox"/> GPIO port with +5V DC and +3.3V DC</li> <li><b>On Board peripherals</b></li> <li><b>Relay</b></li> <li><input type="checkbox"/> 5V SPDT Mechanical Relay</li> <li><input type="checkbox"/> NO &amp; NC LED indicator</li> <li><input type="checkbox"/> Screw Terminal Block Connector for external device</li> <li><b>Buzzer</b></li> <li><input type="checkbox"/> Operating Voltage : 3-6V DC</li> <li><input type="checkbox"/> Tone Type : Single</li> <li><input type="checkbox"/> Osc. Frequency : 3.2KHz, 87Db</li> <li><b>Temperature Sensor</b></li> <li><input type="checkbox"/> Operating Temperature range : -55°C = TA = +150°C</li> <li><input type="checkbox"/> Scale Factor : 10 mV/°C</li> <li><input type="checkbox"/> Output Voltage Range : 100mV - 2000mV</li> <li><b>Switch &amp; LED</b></li> <li><input type="checkbox"/> Three user interface SMD LEDs &amp; Switches</li> </ul>
<p><b><u>Planar waveguide module</u></b></p>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Reflection/Refraction experiments are performed using quartz half cylindrical lens mounted on graduated rotational mounts.</li> <li><input type="checkbox"/> Allows construction and characteristics study of single and multimode planer waveguides.</li> <li><input type="checkbox"/> Involves opto-electronics and optical components along with opto-mechanical hardware.</li> <li><input type="checkbox"/> Allows construction of planer waveguides using ion exchange method.</li> <li><input type="checkbox"/> Extensive documentation to support development and study of waveguides.</li> <li><input type="checkbox"/> Light coupling method using prism coupling technique.</li> <li><input type="checkbox"/> Allows study of fundamental properties of geometrica optics.</li> <li><b>Laser</b></li> <li><input type="checkbox"/> Wavelength 635nw.</li> <li><input type="checkbox"/> Light - redvisible.</li> <li><input type="checkbox"/> o/ppower 1mw.</li> <li><input type="checkbox"/> complete system with power supply</li> <li><b>Prism</b></li> <li><input type="checkbox"/> Right angle prism (10X10X10mm. +0/-0.2mm)</li> <li><input type="checkbox"/> Surface Quality :60/40</li> <li><input type="checkbox"/> Surface flatnen :1 lambda</li> <li><input type="checkbox"/> Refractive Index :&gt;1.7</li> <li><input type="checkbox"/> Surface polished-diagonal, bone and back side.</li> <li><input type="checkbox"/> Surface unpolished-Two sided surface.</li> <li><b>Colimeter</b></li> <li><input type="checkbox"/> Gallilium construction</li> <li><input type="checkbox"/> Magnification by 10X</li> </ul>

	<p><b>Waveguide</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Singlemode,multimode waveguide</li> <li><input type="checkbox"/> Substrate - Soda limeglass</li> <li><input type="checkbox"/> Ion exchange using potatium ion(KnO3 )bath</li> </ul>
<p><b>Physics of Fiber Optic Lab</b></p>	<ul style="list-style-type: none"> <li>• He-Ne laser source with 1mW output power and 633.5nm wavelength</li> <li>• Laser to fiber coupler with Lens adjustment facility to adjust beam into core of fiber, Coupling Efficiency of &gt;70% for SM fibers and &gt; 90% for MM fibers, Wavelength of operation 180 to 2000nm, power handling capacity more than1 watt</li> <li>• Laser power meter with separate Sensor unit with stand and separate display unit, power measurement of 2μW ~ 20W with 1nW resolution, Power density of 15KW/cm2, Sensor diameter of 20mm, Wavelength of operation 400 ~ 1100 nm and calibrated to 633nm</li> <li>• Optical fiber patch chords and accessories required for experimentation purpose: <ul style="list-style-type: none"> <li>a. 9 micron single mode glass fiber patch chord</li> <li>b. 62.5 micron multi mode glass fiber patch chord</li> <li>c. 100 micron multi mode glass fiber patch chord</li> <li>d. 9 micron single mode glass fiber pigtail</li> <li>e. 100 meter 9 micron single mode glass fiber cable with ST connectors</li> <li>f. 1000 meter 9 micron single mode glass fiber cable with ST connectors</li> <li>g. ST to ST Matting Sleeve –2</li> <li>h. Optical platform</li> <li>i. Laser to fiber coupler holder</li> <li>j. Laser Source holder</li> <li>k. Fiber Holder with vertical and horizontal positioning facility</li> <li>l. Display screen</li> </ul> </li> </ul>

<b>Fiber Optic Laser Source And Detector Module</b> <hr/>	<input type="checkbox"/> Type : Laser <input type="checkbox"/> Central wavelength: 1310nm <input type="checkbox"/> Spectral width : 1nm <input type="checkbox"/> Output power : 1.5mW <input type="checkbox"/> Threshold Current : 15mA Maximum <b>Detector</b> <input type="checkbox"/> Type : PIN photo diode <input type="checkbox"/> Spectral bandwidth : 1250nm ~ 1600nm <input type="checkbox"/> Responsivity : 0.8A/W <input type="checkbox"/> Bandwidth : 155MHz <input type="checkbox"/> Return loss : 40dB <input type="checkbox"/> Reverse voltage,VR : Maximum 30V <input type="checkbox"/> Reverse current, IR : Maximum 500 $\mu$ A <input type="checkbox"/> Maximum supported data rate: 3mbps <b>Pulse generator</b> <input type="checkbox"/> Pulse width : Selectable from 30ns and 100ns <input type="checkbox"/> Pulse amplitude: 4Vpeak <b>EXPERIMENTS</b> <input type="checkbox"/> I-V characteristics of Laser <input type="checkbox"/> P-I characteristics of Laser <input type="checkbox"/> Digital data transmission <input type="checkbox"/> Analog signal transmission <input type="checkbox"/> PC to PC communication <ul style="list-style-type: none"> <li><input type="checkbox"/> Used with FOM-2 to study passive components <ul style="list-style-type: none"> <li>- Isolator</li> <li>- Attenuator</li> <li>- Coupler</li> </ul> </li> </ul>
<b>Chromatic Dispersion Module</b> <hr/>	<input type="checkbox"/> Length of fiber : 25 Kilometer <input type="checkbox"/> Type of fiber : Singlemode <input type="checkbox"/> Attenuation : $\leq 0.05$ dB/km@1285 ~1330nm and 1525nm ~1575nm <input type="checkbox"/> Cable cut off wave length : $\leq 1260$ nm <input type="checkbox"/> Chromatic dispersion : $\leq 3.5$ ps/(nm.km) @ 1285 nm ~ 1330nm ) <input type="checkbox"/> Zero dispersion wavelength : 1300nm ~1320nm <wavelength< td=""></wavelength<> <input type="checkbox"/> Multimedia based interactive e-manual
<b>Vertically Articulated 5 AXIS Robot ARM</b> <hr/>	<ul style="list-style-type: none"> <li>• Mechanical Structure: Vertically articulated; open frame</li> <li>• Degrees of Freedom : 5 rotational axes and gripper</li> <li>• Payload Capacity : 2.1 kg</li> <li>• Reach : 610 mm (24") with gripper</li> <li>• Speed : 700 mm/sec (27.6"/sec)</li> <li>• Repeatability : <math>\pm 0.18</math> mm (0.007")</li> <li>• Position Feedback : Incremental optical encoders</li> <li>• Homing : Micro switch on each axis</li> <li>• Actuators : 12 V dc servo motor on each axis</li> <li>• Gripper : DC servo motor, 2-finger parallel</li> <li>• Gripper Jaw Opening: 0-65/75 mm (2.6"/3")</li> </ul>

- **Transmission** : Gears, timing belts, lead

**Axis Range**

- Axis 1 : Base rotation 310
- Axis 2 : Shoulder rotation +130/-35
- Axis 3 : Elbow rotation +130
- Axis 4 : Wrist pitch +130
- Axis 5 : Wrist roll  $\pm 570$

**CONTROLLER**

- Communication : USB type A cable connection to PC; Plug and play without rebooting
- Inputs/Outputs : 8 digital inputs; 4 analog inputs; 8 digital outputs (4 relay, 4 open collector); 2 analog outputs
- Microcontroller : Full featured, NEC V853 RISC 32-bit microcontroller
- Axis Servo Control : Real-time; PID; PWM Servo Axes : 8 (robot arm, gripper and 2 peripheral devices)
- User Memory : Unlimited programs, program lines and variables, positions
- Position Definition : Absolute, Relative, Cartesian, Joints, Encoders
- Trajectory Control : Joint, Linear, Circular
- Speed Definition : 100 speed settings (percentages); travel time definition; millimeter per second (mm/sec) for robot linear movement Control Parameters : 160 user-accessible parameters
- Safety Features : Emergency switch; short-circuit Protection; automatic shut-down upon detection of impact, overheating, PC failure or communication error

**SOFTWARE**

**SCORBASE:** Robotic programming & operation software

**RoboCell:** 3D graphic simulation software ( optional ) enables offline design and simulation of virtual robotic cell and online graphic tracking of actual cell

**Accessories (optional):** Teach pendant, linear belt conveyor, rotary index table, linear slide bases, and sensors XY positioning table, parts feeders, I/O experiment table, pneumatic grippers, End effectors, machine vision system, workbenches, coordinate grid.