INVITATION FOR QUOTATION

TEQIP-III/2019/NITMGH/Shopping/103 **02-Jan-2019**

Sub: Invitation for Quotations for supply of Goods in Civil Engineering Department

Dear Sir,

You are invited to submit your most competitive quotation for the following goods with item wise detailed specifications given at Annexure I,

Sr. No	Brief Description	Quantity	Delivery Period (In days)	Place of Delivery	Installation Requirement (if any)
1	Universal Test Frame for Structures Experiments and experiment modules	1	15	National Institute of Technology Meghalaya, Bijni Complex, Laitumkhrah Shillong 793003	Yes

1. Government of India has received a credit from the International Development Association (IDA) towards the cost of the **Technical Education Quality Improvement Programme [TEQIP]-Phase III** Project and intends to apply part of the proceeds of this credit to eligible payments under the contract for which this invitation for quotations is issued.
2. Quotation,

   2.1 The contract shall be for the full quantity as described above.

   2.2 Corrections, if any, shall be made by crossing out, initialing, dating and re writing.

   2.3 All duties and other levies payable by the supplier under the contract shall be included in the unit price.

2.4 Applicable taxes shall be quoted separately for all items.

2.5 The prices quoted by the bidder shall be fixed for the duration of the contract and shall not be subject to adjustment on any account.

2.6 The Prices should be quoted in Indian Rupees only.

3. Each bidder shall submit only one quotation.
4. Quotation shall remain valid for a period not less than **45** days after the last date of quotation submission.
5. Evaluation of Quotations,

   The Purchaser will evaluate and compare the quotations determined to be substantially responsive i.e. which

   5.1 are properly signed ; and

   5.2 confirm to the terms and conditions, and specifications.
6. The Quotations would be evaluated for all items together.
7. Award of contract:

   The Purchaser will award the contract to the bidder whose quotation has been determined to be substantially responsive and who has offered the lowest evaluated quotation price.

   7.1 Notwithstanding the above, the Purchaser reserves the right to accept or reject any quotations and to cancel the bidding process and reject all quotations at any time prior to the award of contract.

   7.2 The bidder whose bid is accepted will be notified of the award of contract by the Purchaser prior to expiration of the quotation validity period. The terms of the accepted offer shall be incorporated in the purchase order.
8. Payment shall be made in Indian Rupees as follows:

   Delivery and Installation - 90% of total cost

   Satisfactory Acceptance - 10% of total cost
9. All supplied items are under warranty of **24** months from the date of successful acceptance of items.
10. You are requested to provide your offer latest by **3:00** hours on **16-Jan-2019 .**
11. Detailed specifications of the items are at Annexure I.

12. Training Clause (if any) **Yes**
13. Testing/Installation Clause (if any) **Yes**
14. Information brochures/ Product catalogue, if any must be accompanied with the quotation clearly indicating the model quoted for.
15. Sealed quotation to be submitted/ delivered at the address mentioned below,

    Bijni Complex, Laitumkhrah, Shillong 793003
16. We look forward to receiving your quotation and thank you for your interest in this project.
17. **Technical Presentation:** If necessary then the authority may ask the technically qualified bidders to give full presentation or live demonstration of the Quoted equipment at NIT Meghalaya before finalization of the tenders as a support of their specification.

(Authorized Signatory)

Name & Designation

Coordinator TEQIP-III National Institute of Technology Meghalaya

Annexure I

	UNIVERSAL TEST FRAME FOR STRUCTURES EXPERIMENTS AND EXPERIMENT MODULES – IT SHOULD CONSISTS OF THE FOLLOWING:
	STRUCTURES PLATFORM INCLUDING DATA ACQUISISTION INTERFACE **Description:** The structure platform should support optional structure experiment modules, available separately. Platform should be made from precision, slotted aluminium extrusion and steel end-plates, this module forms a sturdy, rigid, stable and strong experimental platform. It should be designed for easy assembly and to fit on any standard desktop. It should have adjustable feet to ensure the platform is levelled before use. The platform should have easy to read scale on each side of the platform to help students to position the parts of their experiment precisely, and remove the need for and additional rule. The compact size and low centre of gravity should ensure that the students can use the equipment easily and at an ergonomic height, either sitting or standing. The plat form should include the USB interface plug and play hub to simplify connections. The hub should be able to convert signals from the sensor on each experimental module to USB data format for computer display and data

	acquisition. It should have LabVIEW from National Instrument to create user-friendly data acquisition software that works with each of the optional experimental module. **Experimental Module Supported** • Redundant Frame Truss • Portal Frame Deflection And Reaction • Three Pinned Arch • Two Pinned Arch • Deflection of Beams And Cantilevers • Simple Suspension Bridge • Buckling of Struts **Technical Detail:** Hexagonal Tools(for assembly) USB Interface HUB and fixing USB Cable AC Main Adapter User Guide DAQ Software Dimension: 1062mm long x 420mm wide x 295mm high
	REDUNDANT FRAME TRUSS **Description** The apparatus to be used for analysis of statically determinate and indeterminate truss structures made from a number of 'members' held together by joints at their ends. Two supports hold the truss. One support allows rotation only and the other allows rotation and translation. Should be provision to apply a load to the truss at the free end Joint Boss. Strain gauges on each truss member measure the forces due to the load. A precision indicator measures the framework deflection due to the load. A hand-operated load cell assembly applies and measures the load. A simple thumbscrew engages and disengages an extra 'redundant' member. The strain gauges connect to a Strain Gauge Amplifier, which connects (with the load cell) to the USB Interface Hub of the Structures Platform for computer display and data acquisition. **Software** Apparatus should have LabVIEW from National Instruments to create data acquisition applications for each Experiment Module, with simulated experiment applications. **Technical details** • Strain Gauge Amplifier, 16 input • Pinned and roller supports • Additional Upright • Trammel Arm with Digital Indicator of resolution 0.001 mm • Load Cell of maximum capacity 650 N • Pre-assembled truss of five joint bosses and eight square-section members • Three cables for computer display and data acquisition • Inclinometer • Hexagon tools for fixings

- Storage Tray
- Simulation Software
- User Guide

Services needed

The structure platform.

Experiments and topics

- Strain Gauges as instruments.
- Forces within and deflections of:
  - A truss structure that is statically determinate
  - A truss structure that is statically indeterminate
- Member forces by the Method of Joints and Method of Sections.
- Member forces by the use of the strain-energy method.
- Advantages and disadvantages of both versions of the truss.

PORTAL FRAME DEFLECTIONS AND REACTIONS

Description:

The apparatus to understand the deflection and reaction of a portal frame under various loading conditions. To fit one of a two frames between supports and apply vertical loads to the beam member. Load cells in the supports measure the bending moment and horizontal reaction at the base of the uprights due to load. A precision indicator measures any horizontal deflection (sway) at the junction of the beam and uprights. Each support includes pointers that work with the scale on the platform for accurate positioning.

One of the frames has a uniform second moment of area for both the upright and the beam, the other has one uprights with a second moment of area of approximately half that of the other uprights and the beam. Both frame beams can be loaded anywhere along their length.

This product should includes a Vernier Calliper for accurate measurement of the frame cross-section. The deflection indicator has its own display but it can connect (with the load cells) to the USB Interface Hub of the Structures Platform for computer display and data acquisition.

Software

Apparatus should have LabVIEW from National Instruments to create data acquisition applications for each Experiment Module, with simulated experiment applications.

Technical details

- Two supports, one with horizontal reaction load cell, the other with a fixing moment load cell.
- Uniform frame of 250 mm height x 500 mm length and nominal cross-section: 15 mm x 2 mm.
- Non-uniform frame of 250 mm height x 500 mm length. Nominal cross-sections 15 mm x 2 mm and one vertical of 15 x 1.5 mm.
- Three cables for computer display and data acquisition.
- Three Mass Hangers.
- 25 x 20 g masses.
- Vernier Caliper.
- Hexagon Tool.
- Storage Tray.
- Simulation Software.
- User Guide.

Services needed

The structure platform.

Experiments and topics

- Horizontal reaction and fixing moment due to a varying single point load on a portal frame.
- Uniform and non-uniform cross-section portal frames.
- Predicting sway direction by consideration of shear forces.
- Use of the Moment Distribution (Hardy Cross) Method to calculate bending moments, sway magnitude and horizontal support reactions.
- Deflection (sway) of a portal frame due to loading asymmetry.
- Deflection (sway) of a portal frame due to asymmetry of the uprights.
- Plotting bending moment diagrams.

THREE PINNED ARCH

Description

The apparatus to understand how loads affect the horizontal reaction forces in a three pinned arch.

Provision to apply loads to hangers suspended from the arch, held between two supports. One support allows rotational movement only, acting as a pinned support. The other support allows translational movement, acting as a roller support. A load cell prevents the translation, while measuring the horizontal reaction due to the load. Each support includes pointers that work with the scale on the platform for accurate positioning. A third set of bearings at the crown of the arch forms a third pinned joint. This product includes additional masses so students may apply a uniformly distributed load (UDL) across the span of the arch for comparison of results with a single point load.

The load cell connects to the USB Interface Hub of the Structures Platform for computer display and data acquisition.

Software

Apparatus should have LabVIEW from National Instruments to create data acquisition applications for each Experiment Module, with simulated experiment applications.

Technical details

- Two arch supports, holding an arch of 0.5 m span x 0.1 m height
- One cable for computer display and data acquisition
- Nine Mass Hangers
- 50 x 20 g masses
- Storage Tray
- Simulation Software
- User Guide

Services needed

The structure platform.

Experiments and topics

- Horizontal reaction due to a varying single point load on a statically determinate structure.
- Horizontal reaction due to a moving single point load on a statically determinate structure.
- Horizontal reactions due to a uniformly distributed load on a statically determinate structure.
- Influence lines and superposition.

- Lines of thrust in an arch.
- Graphical construction of a bending moment diagram for point loads.
- Maximum bending moments due to a load on an arch.

TWO PINNED ARCH

Description

The apparatus understand how loads affect the horizontal reaction forces in a two-pinned arch.

Provision to apply loads to hangers suspended from the arch, held between two supports. One support allows rotational movement only, acting as a pinned support. The other support allows translational movement, acting as a roller support. A load cell prevents the translation, while measuring the horizontal reaction due to the load. Each support includes pointers that work with the scale on the platform for accurate positioning.

The product should include additional masses so students may apply a uniformly distributed load (UDL) across the span of the arch for comparison of results with a single point load.

The load cell connects to the USB Interface Hub of the Structures Platform for computer display and data acquisition.

Software

Apparatus should have LabVIEW from National Instruments to create data acquisition applications for each Experiment Module, with simulated experiment applications.

Technical details

- Two arch supports, holding an arch of 0.5 m span x 0.1 m height
- One cable for computer display and data acquisition
- Nine Mass Hangers
- 50 x 20 g masses
- Storage Tray
- Simulation Software
- User Guide

Services needed

The structure platform.

Experiments and topics

- Horizontal reaction due to a varying single point load on a statically indeterminate structure.
- Horizontal reaction due to a moving single point load on a statically indeterminate structure.
- Horizontal reactions due to a uniformly distributed load on a statically indeterminate structure.
- Influence lines and superposition.
- Lines of thrust in an arch.
- Graphical construction of a bending moment diagram for point loads.
- The Secant assumption.
- Maximum bending moments due to a load on an arch.

DEFLECTION OF BEAMS AND CANTILEVERS

Description

The apparatus to understand the elastic properties of beams and cantilevers. Should choose from a selection of test beams and fit them to supports. May choose to fit the beams to one support only, forming a cantilever. May also fit them between two supports with different fixing methods, forming simply supported and fixed or 'Encastre' beams. Each support includes pointers that work with the scale on the platform for accurate positioning.

Can apply loads to any position along the beam and measure the resulting deflection, also at any point along the beam.

This product should include a set of beam 'specimens' of different metals and cross-section for comparison of the elastic properties and 'I' value. It also allows to vary the effective length of the beam to see how this affects the magnitude of deflection for any given load.

The Deflection Indicator has its own display, but it can connect to the USB Interface Hub of the Structures Platform for computer display and data acquisition.

Software

Apparatus should have LabVIEW from National Instruments to create data acquisition applications for each Experiment Module, with simulated experiment applications.

Technical details

- Two Beam Supports with two fixing methods
- Support with Digital Deflection Indicator of resolution 0.01 mm
- Five different beams of length 850 mm and nominal cross sections: Aluminium 19 x 3.2 mm, 19 x 4.8 mm and 25.4 x 3.2 mm Brass 25.4 mm x 3.2 mm Mild Steel 25.4 mm x 3.2 mm
- One cable for computer display and data acquisition
- Nine Mass Hangers
- 50 x 20 g masses
- Hexagon tools for beam fixings
- Vernier Caliper
- Storage Tray
- Simulation Software
- User Guide

Services needed

The structure platform.

Experiments and topics

- Beam bending formula and structural 'stiffness'.
- Deflection due to point loads and UDLs (uniformly distributed loads).
- How beam fixings affect deflection of:
  - Simply Supported beams
  - Fixed or 'Encastre' beams
  - Cantilever beams
  - Propped Cantilever
- Shape of a deflected beam.
- Beam length and deflection.
- Beam material and deflection—the Elastic (Young's) Modulus.
- Beam cross-section and deflection—the Second Moment of Area ('I' value)
- Pure Bending of a beam.
- Reciprocal Theorem (Maxwell-Betti).

SIMPLE SUSPENSION BRIDGE

Description

The apparatus to understand how loads affect tension in the suspension cable supporting the 'deck' of a suspension bridge. to add loads to the deck held by the suspension cable between two supports. A load cell in the left-hand support measures the cable tension.

apply loads, which change the cable tension.

This product should includes additional masses so students may apply a uniformly distributed load (UDL) and a single point load.

The load cell connects to the USB Interface Hub of the Structures Platform for computer display and data acquisition.

Software

Apparatus should have LabVIEW from National Instruments to create data acquisition applications for each Experiment Module, with simulated experiment applications.

Technical details

- Two bridge supports
- Cable suspension bridge and deck. 0.5 m span and 0.1 m sag
- One cable for computer display and data acquisition
- Nine Mass Hangers
- 50 x 20 g Masses
- Hexagon tool for assembly
- Storage Tray
- Simulation Software
- User Guide

Services needed

The structure platform.

Experiments and topics

- How bridge load affects the tension in a suspension cable.
- Comparing a central point load with a UDL.
- Exploring the ratio of bridge 'deck' mass and a moving load.
- Comparing simple parabola-based theory with a more realistic analysis of the model.

BUCKLING OF STRUTS

Description

The apparatus to understand the nature of buckling in slender beams that simulate 'struts'. To fit one of a choice of struts between the two major parts of the product. One part should have a hand-operated control to apply the buckling force. The other part has a load cell to measure the applied load.

Apply a buckling force to a strut, measuring the load and the point at which the strut collapses or 'buckles'.

This product should include specimen struts of different lengths for comparison of the buckling loads. It also includes different strut end fixings for comparisons of how they affect the buckling load and shape of the strut as it buckles. A Vernier Calliper should be included to measure the cross-section of the struts.

The load cell connects to the USB Interface Hub of the Structures Platform for computer display and data acquisition.

Software

Apparatus should have LabVIEW from National Instruments to create data acquisition applications for each Experiment Module, with simulated experiment applications.

Technical details

- Two main parts: a load application assembly end and a load measurement assembly. Maximum Load 400 N.
- Five aluminium struts: Each of nominal 20 mm x 2 mm cross-section. Lengths 400 mm, 450 mm, 500 mm, 550 mm and 600 mm.
- Interchangeable end fixings.
- Hexagon tools.
- One cable for computer display and data acquisition.
- Vernier Caliper.
- Storage Tray.
- Simulation Software.
- User Guide.

Services needed

The structure platform.

Experiments and topics

- Strut length and the collapse load.
- Euler's critical load.
- Slenderness ratio.
- Effective Length.
- The collapse load and strut fixings, including:
- Pinned-pinned
- Fixed-pinned
- Fixed-fixed

EXPERIMENTAL SETUP TO MEASURE BENDING MOMENT IN A BEAM

Technical Details

To investigate the bending moment at a point in a beam.

Bench mounted apparatus

It consists of a rigid beam which has a hinge point.

A spring balance between two arms is used to determine the bending moment.

The beam is mounted on a stand which has levelling screws.

The right-hand support is adjustable so that the effective span is varied.

	□The test beam is loaded by the three hangers and stirrups supplied with the apparatus. □Thus a wide variety of loading conditions are possible. □The beam is fitted with two locking pins so that load adjustments may be safely made. □Then, once set-up, the pins may be carefully removed to check that the calculations have been correctly performed. □The apparatus is used to determine influence lines as well as plotting bending moment diagrams. □Set of three adjustable load hangers and stirrups □Stand with screw feet and adjustable support point.

FORMAT FOR QUOTATION SUBMISSION

(In letterhead of the supplier with seal)

Date: _____

To:

_____

_____

Sl. No.	Description of goods (with full Specifications)	Qty.	Unit	Quoted Unit rate in Rs. (Including Ex Factory price, excise duty, packing and forwarding, transportation, insurance, other local costs incidental to delivery and warranty/ guaranty commitments)	Total Price (A)	Sales tax and other taxes payable	
						In %	In figures (B)
Total Cost							

Gross Total Cost (A+B): Rs. _____

We agree to supply the above goods in accordance with the technical specifications for a total contract price of Rs. ———————— (Amount in figures) (Rupees ————————amount in words) within the period specified in the Invitation for Quotations.

We confirm that the normal commercial warranty/ guarantee of ———————— months shall apply to the offered items and we also confirm to agree with terms and conditions as mentioned in the Invitation Letter.

We hereby certify that we have taken steps to ensure that no person acting for us or on our behalf will engage in bribery.

Signature of Supplier

Name: _____

Address: _____

Contact No: _____