Republic of the Philippines
NUEVA ECIJA UNIVERSITY OF SCIENCE AND TECHNOLOGY
Cabanatuan City
044-463-0226
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INVITATION TO BID

The Nueva Ecija University of Science and Technology through its Bids and Awards Committee (BAC), invites entities to bid for the hereunder projects:

Name of Project: **Supply and Delivery of Civil Engineering Instructional Equipment**
Location: College of Industrial Technology – NEUST, Cabanatuan City
Approved Budget for the Contract (ABC): Php 20,000,000.00
Contract Duration:150 Calendar Days
Fund Source: Income
Bid Documents: Php 25,000.00

ITEM DESCRIPTION/SPECIFICATION:

Fluid Properties and Hydrostatic Bench **Includes: Basic portable pressure meter**
Demonstration Capabilities:
- The provision of practical instruction exercises demonstrating the principles of fluid mechanics, in particular: - Understanding the properties of fluids: - Determining the density, specific gravity and viscosity of different liquids - Observing the effects of capillarity - Understanding the effects of static pressure: - Demonstrating that the free surface of a static liquid is horizontal - Studying the effect of flow on a free surface - Measuring changes in liquid level - Studying the relationship between intensity of liquid pressure and depths - Determining the position of the centre of pressure on a plane surface - Studying the operation and application of pressure gauges and manometers: - Using a direct reading mercury barometer (mercury not supplied) - Measuring air and water pressure using manometers - Comparing results obtained from various devices - Calibrating a Bourdon-type pressure gauge using a deadweight pressure gauge calibrator - Investigating the buoyancy force and stability of floating bodies: - Verifying Archimedes' principle - Determining metacentric height
The following experimental apparatus is included: - Universal hydrometer and hydrometer jars - Falling sphere viscometers - Free surface tubes - Hook and point gauge - Mercury barometer (mercury not supplied) - Bourdon gauge - U-tube manometers - Deadweight pressure gauge calibrator and weights -Hydrostatic pressure apparatus - Pascal's apparatus - Parallel plate capillary apparatus - Capillary tube apparatus u Lever balance with displacement vessel, bucket and cylinder - Metacentric height apparatus - Measuring cylinder - Thermometer - Air pump -600ml beaker

- Stop clock

Universal hydrometer: Range 0.70-2.00 subdivided in 0.01 intervals

Falling sphere viscometer: 40mm tube diameter

Hydrostatic pressure apparatus: Comprises ounter balanced precision quadrant pivoted on knife edges at its centre of arc

Direct reading barometer: With compensated silvered metal scale Range 585-790mm subdivided in 1mm intervals Includes thermometer

100mm dial pressure gauge: Range 0-200 kN/m^2 (kPa) and equivalent head of water in metres

Deadweight pressure gauge calibrator: With 2 x 0.5kg, 1kg and 2.5kg weights

Lever balance: 178mm diameter pan, hook for use in buoyancy experiments, antiparallax cursor, double scale 0-0.25kg and 0-1.00kg

Thermometer: Range -10˚C to +50˚C

Specifications:

- A self-contained and mobile unit for demonstration of the properties of fluids and hydrostatics
- The equipment is mounted on a steel-framed bench fitted with castors
- The benchtop incorporates a recessed plastic sink
- A variety of measuring devices is incorporated in the unit including a universal hydrometer, range 0.70-2.00; falling sphere viscometer; hook and point gauge; hydrostatic pressure apparatus; Pascal's apparatus; double-scale lever balance with displacement vessel, bucket and cylinder; metacentric height apparatus; direct reading barometer range 585-790mm; dial pressure gauge range 0-200 kN/ m2 (kPa); deadweight pressure gauge calibrator with weights; thermometer range -10°C to +50°C
- These devices enable a full range of 16 experiments to be carried out, demonstrating the properties of fluids, the effects of static pressure, the operation and application of pressure gauges and manometers and the investigation of the stability of floating bodies
- A comprehensive manual is included describing how the experiments are performed as well as how to commission the equipment.

Includes:
Basic Portable Pressure Meter
a handheld, portable, battery-operated pressure meter, which is capable of measuring pressures of air or water from 0-2,000mBar (0-1,500mm Hg).

Fluid Properties Apparatus:

The following components are included
2 hydrometer jars (clipped to stand)
1 universal hydrometer (in protective housing)
2 falling-sphere viscometer tubes (clipped to stand)
1 plastic storage box containing steel spheres
1 spirit-filled glass thermometer (in protective housing)
1 direct-reading aneroid barometer (fixed to stand)
1 parallel-plate capillary apparatus
1 capillary tube apparatus with six tubes of varying size
1 Archimedes apparatus comprising displacement vessel, machined bucket & matching cylinder
1 50ml density bottle (Pycnometer)
1 250ml plastic measuring cylinder
1 600ml glass beaker
1 dual-scale lever balance, adapted for use with the Archimedes apparatus

Experimental content
- Measuring density and relative density (specific gravity) of a liquid using a universal hydrometer
- Measuring density and relative density (specific gravity) of a liquid using a pycnometer (density bottle)
- Measuring density and relative density of solid objects or granular material using a Pycnometer
- Measuring viscosity of various liquids at atmospheric temperature and pressure using a Falling Sphere Viscometer.
- Measuring the effect of capillary elevation inside capillary tubes
- Demonstrate the effect of capillary elevation between two flat glass plates due to surface tension in a liquid.
- Verifying Archimedes principle using a brass bucket & cylinder with a lever balance
- Measuring atmospheric pressure using an aneroid barometer

Description

A clear understanding about the physical properties of fluids is essential before studying the behavior of fluids in static or dynamic applications. This apparatus introduces students to the following properties of fluids:

• Density and relative density (specific gravity) • Viscosity • Capillarity – capillary elevation between flat plates and in circular tubes • Buoyancy (Archimedes principle) • Atmospheric pressure
Impact of a Jet
Nozzle diameter 8mm Distance between nozzle & target plate 20mm Diameter of target plate 36mm Target plate 180° hemispherical target 120° target (cone) flat target 30° target 60° target
Experimental content - Principle of linear momentum - To investigate the reaction forces produced by the change in momentum of a fluid flow - Measurement of the forces produced by a jet impinging on solid surfaces which produce different degrees of flow deflection
Free and Forced Vortices
Technical specifications Tank diameter 245mm Height to overflow point 180mm Orifice diameters 8, 16 and 24mm
Forced vortex measuring probes Distance from centre 0, 30, 50, 70, 90 and 110mm Pitot tubes having measuring point (nose) at 15, 25 and 30mm radius Inlet tubes 9 and 12.5mm diameter
Overall dimensions Length 0.60m Width 0.50m Height 0.46m
Experimental content - Understanding the difference between free and forced vortices - Determining the surface profile of a forced vortex - Determining the surface profile and total head distribution of a free vortex - Visualization of secondary flow in a free vortex
Orifice and Free Jet Flow
Orifice diameters 3.0mm and 6.0mm Jet trajectory probes 8 Max constant head 410mm
Experimental content - Establishing the coefficient of velocity for a small orifice - Finding the coefficient of discharge for a small orifice with flow under constant head and flow under varying head - Comparing the measured trajectory of a jet with that predicted by simple theory of mechanics - Effect of tank level on jet outlet velocity
Service Unit
- Integrated pump - Integrated flowmeter with needle valve - Each service unit can be used as either a hot or cold-water supply - Quick connect couplings for easy connection to experiment modules, self-sealing on supply unit to minimize water loss - Digital Manometer and Thermometer provided - Bespoke system for experimental modules that reduces the risk of spillage - Low voltage within the supply unit to protect users
Water flow rate 0–3.5 litres/minute Water volume 5 litres
Digital thermometer Measuring range: -50°C to 1350°C (-58°F to 2462°F)

Accuracy: 0.015%
Includes:
Manometer – Inclined
Manometer - U tube
Additional accessories for the structural system
Three Component Rigid Support Sensor Two Component Pinned Support Sensor Deflector Sensor Simple Support Sensor
Universal Test Frame
Maximum load : 5 kN
The frame has specially designed slots and self-positioning nuts that hold the Structures experiments and instruments. This fixing system is quick and easy to use. It allows students to change, position and secure each experiment. Adjustable feet support the frame to allow students to level the apparatus before use.
Digital Force Display
• Ranges 0.0 to 20.0 N (0.1 N resolution) and 0 to 500 N (1 N resolution)
• Liquid crystal display
• Real-time display of each of up to four forces
A four-way selector switch selects the displayed force. The display automatically adjusts its range to the force. Includes an output to the Automatic Data Acquisition Unit. When used with the data acquisition system the Digital Force Display outputs all four force signals at the same time to the Structures Software
Automatic Data Acquisition Unit
Key features • Computer interface and Structures Software to display and collect data from any of the experiment modules in Structures range • Includes Structures Software to do two things: display and collect data, and allow 'virtual' simulated experiments • Interface unit links to load cells and other instruments in the Structures range to send data to a suitable computer • Allows students to compare results from actual experiments with results from simulation software • Simple connection to most modern computers – no need to add any extra circuit boards • Fully automatic – needs no adjustments or complicated set-up procedures on your computer
It allows data logging, analysis and extra 'virtual' simulated experiments. It accepts inputs from a digital force display, a digital strain display, an angular sensor and digital deflection indicators. It converts these inputs into the correct data signals for the computer. The software can then analyse the data and create tables and charts. The software can also simulate experiments which students can perform using the hardware, so they can compare simulated and real results.
Pin Jointed Frameworks with additional load cell
Learning outcomes • Study of Bow's notation, strains, stresses, forces and deflections in various frameworks, including a Warren girder and roof truss • Comparison of different frameworks
Key specifications • 0 to 500 N load cell with electronic load sensor • 9 universal bosses: each connect members at 30, 45 or 60 degrees • 15 stainless steel members: various lengths with strain gauges attached
Load: 0 to 500 N load cell with electronic load sensor (extra load cells are available) Bosses: 9 universal bosses, each connect members at 30, 45 or 60 degrees Members: 15 stainless steel, various lengths with strain gauges attached Strain measurement: 16-way digital strain bridge Deflection measurement: Digital deflection indicator
The equipment includes two framework supports: a pivoting support, and a pivoting and rolling support. Each member has a strain gauge attached that connects to a digital strain bridge. A load cell applies loads to the structure at various angles. When connected to the Digital Force Display, the load cell measures the applied load. To apply loads simultaneously, extra load cells are included
Bending Moments in a Beam

Learning Outcomes • Bending moment variation at the point of loading • Variation of bending moment away from the point of loading • Examination of various other loading cases, including loads traversing the beam
Key specifications • 5 weight hangers and 150 x 10 g masses • 24 loading positions along the beam 20mm apart • Force measured by electronic load cell
Shear Force in a Beam
Learning outcomes • Shear force variation with an increasing point load • Variation of shear force for various loading conditions • Examination of various other loading cases and their effect on shear force, including loads traversing the beam
Key specifications • Five weight hangers and 150 x 10 g masses • Twenty-three loading positions along the beam 20mm apart • Force measured by electronic load cell
Deflection of Beams & Cantilevers
Learning outcomes • Examination of: – Beam deflections – General bending formulae – Beam end rotations – Elastic moduli (Young's modulus) for various materials • Typical conditions are: – Cantilever – Propped cantilever – Encastre beam – Simply supported beam Key specifications • Ten knife-edges with weight hangers and 150 x 10 g masses • Three test beams (1 x aluminum, 1 x steel, 1 x brass) • Digital deflection indicator
ADDITIONAL REQUIREMENTS:
1. Bidder should provide continuous free re-training during warranty period free of charge
2. Country of Origin from Japan, USA, UK, Europe
3. Bidder should submit 100% Credit Line Certificate equivalent to the amount of Approved Budget Ceiling
4. Bidder should submit at least 5 (five) service performance certificate from various client (2017-2020)
5. Delivery Period: 150 calendar days from receipt of Notice to Proceed
6. Warranty Period: 2 years from date of acceptance

The schedule of the bidding activities are as follows:

Activities	Schedule
1. Advertisement/Receipt of Letter of Intent	September 29, 2020 – October 06, 2020
2. Pre-bid Conference	October 07, 2020 – 9:00 A.M. NEUST President's Office Conference Room, Sumacab Campus, Cabanatuan City
3. Submission of Bids	October 19, UNTIL 5:00 PM NEUST President's Office Conference Room, Gen. Tinio St., Cabanatuan City
4. Opening of Bids	October 20, 2020, 9:00 AM NEUST President's Office Conference Room, Sumacab Campus, Cabanatuan City
5. Post Qualification	October 21 2020, 9:00 AM NEUST President's Office Conference Room, Sumacab Campus, Cabanatuan City

Letter of Intent must be submitted on or before 5:00 PM on October 06, 2020.

Bidding will be conducted through open competitive bidding procedures using a non-discretionary "pass/fail" criterion as specified in the 2016 Revised Implementing Rules and Regulations (IRR) of Republic Act (RA) 9184, otherwise known as the "Government Procurement Reform Act".

Bidding is restricted to Filipino citizens/sole proprietorships, partnerships, or organizations with at least sixty percent (60%) interest or outstanding capital stock belonging to citizens of the Philippines, and to citizens or organizations of a country the laws or regulations of which grant similar rights or privileges to Filipino citizens, pursuant to RA 5183.

A complete set of Bidding Documents may be acquired by interested Bidders from October 7 – October 19, 2020 upon payment of the applicable fee for the Bidding Documents, pursuant to the latest Guidelines issued by the GPPB in the amount of P25,000.00.

It may also be downloaded free of charge from the website of the Philippine Government Electronic Procurement System (PhilGEPS) and the website of the Procuring Entity, provided that Bidders shall pay the applicable fee for the Bidding Documents not later than the submission of their bids.

Bids must be duly received by the BAC Secretariat at the address below on or before October 19, 2020, 5:00PM. All Bids must be accompanied by a bid security in any of the acceptable forms and in the amount stated in the PBD.

Bid opening shall be on October 20, 2020, 9:00AM at NEUST Conference Room, Sumacab Campus, Cabanatuan City. Bids will be opened in the presence of the bidders' representatives who choose to attend at the address below. Late bids shall not be accepted.

The Nueva Ecija University of Science and Technology reserves the right to reject any and all bids, declare a failure of bidding, or not award the contract at any time prior to contract award in accordance with Section 41 of RA 9184 and its IRR, without thereby incurring any liability to the affected bidder or bidders.

For more information concerning this bidding, please contact the following:

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Bids and Awards Committee Secretariat
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Approved by:

DR. HONORATO P. PANAHON
BAC Chairperson