



Republic of the Philippines  
**NUEVA ECIIJA UNIVERSITY OF SCIENCE AND TECHNOLOGY**  
 Cabanatuan City  
 044-463-0226  
[www.neust.edu.ph](http://www.neust.edu.ph)

## 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 Mechanical Engineering Instructional Equipment**

Location: College of Industrial Technology – NEUST, Cabanatuan City

Approved Budget for the Contract (ABC): Php 10,000,000.00

Contract Duration: 150 Calendar Days

Fund Source: Trust Fund/CHED Institutional Grants

Bid Documents: Php 25,000.00

### ITEM DESCRIPTION/SPECIFICATION:

<b>1 SET – Engine Test Set</b>
Instrumentation dimensions (fully assembled with fuel tank): Width 1400 mm x depth 300 mm x height 820 mm
Bed and trolley dimensions (without engine): Width 950 mm x depth 475 mm x height 1050 mm
Dynamometer: Hydraulic variable fill
Maximum absorption: 7.5 kW @ 7000 rev.min <sup>-1</sup>
Typical engine range: 3 to 4 kW, 3000 rev.min <sup>-1</sup> , 150 to 250 cc
Speed measurement: Proximity pick up and digital display
Torque measurement: Strain gauged load cell and digital display
Air consumption measurement: Air-box and orifice plate, pressure transducer and digital display
Ambient air temperature and barometric pressure measurement: Thermocouple, pressure transducer and digital display
Exhaust temperature measurement: Engine thermocouple and digital display
Fuel consumption: Precision volumetric fuel gauges (automatic digital versions)
<b>Automatic Volumetric Fuel Gauge</b>
The Automatic Volumetric Fuel Gauge consists of a: <ul style="list-style-type: none"> <li>• precision fuel gauge with sensors;</li> <li>• digital read-out (display) unit which shows fuel consumption and allows data to be transferred to a suitable PC data acquisition system</li> </ul>
The gauge mounts on the instrumentation frame of the test set and connects between the fuel tank and the engine under test. Fuel enters the fuel gauge from the fuel tank. A solenoid valve automatically shuts off the fuel supply from the tank so that the engine draws the fuel from the fuel gauge. Sensors on the fuel gauge record the time taken to consume a set volume of fuel, and the display unit automatically calculates the fuel consumption. The solenoid valve then opens and the fuel gauge refills. The unit can be set to continuously cycle in this manner or cycle once only.
<b>Modified four stroke petrol engine (electric start)</b>
Learning Outcomes <ul style="list-style-type: none"> <li>• Torque, speed and power relationship</li> <li>• Brake mean effective pressure</li> <li>• Engine performance curves</li> <li>• Air and fuel consumption</li> </ul>

<ul style="list-style-type: none"> <li>• Volumetric and thermal efficiencies</li> </ul>
<p>When used with Small Engine Test Set, Cylinder Head Pressure Transducer, Crank Angle Encoder and Engine Cycle Analyzer, students can investigate further features including:</p> <ul style="list-style-type: none"> <li>• Plotting <math>p</math>-<math>q</math> and <math>p</math>-<math>V</math> diagrams</li> <li>• Engine cycle analysis</li> <li>• Indicated mean effective pressure</li> <li>• Indicated power</li> <li>• Comparison of brake and indicated mean effective pressures</li> <li>• Mechanical efficiency of the engine</li> </ul>
<p>Net Torque: 12.5 Nm at 2800 rev.min<sup>-1</sup></p>
<p>Speed: Governed to approximately 3600 rev.min<sup>-1</sup></p>
<p>Cooling: Air cooled</p>
<p>Engine capacity: 208 cc</p>
<ul style="list-style-type: none"> <li>• Electric start</li> <li>• Includes colour-coded fuel tank with quick-release couplings</li> </ul>
<p><b>Modified Four Stroke Diesel Engine (Electric Start)</b></p>
<ul style="list-style-type: none"> <li>• Electric start</li> <li>• Includes colour-coded fuel tank with quick-release couplings</li> </ul>
<p>Learning outcomes</p> <ul style="list-style-type: none"> <li>• Torque, speed and power relationship</li> <li>• Brake mean effective pressure</li> <li>• Engine performance curves</li> <li>• Air and fuel consumption</li> <li>• Volumetric and thermal efficiencies</li> <li>• Willans line</li> </ul>
<p>When used with Small Engine Test Set, Cylinder Head Pressure Transducer, Crank Angle Encoder and Engine Cycle analyzer, students can investigate further features including:</p> <ul style="list-style-type: none"> <li>• Plotting <math>p</math>-<math>q</math> and <math>p</math>-<math>V</math> diagrams</li> <li>• Engine cycle analysis</li> <li>• Indicated mean effective pressure</li> <li>• Indicated power</li> <li>• Comparison of brake and indicated mean effective pressures</li> <li>• Mechanical efficiency of the engine</li> </ul>
<p>Engine capacity: 232 cc</p> <p>Power and Torque: 3.75 kW and 10.8 Nm at 3000 rev. min<sup>-1</sup></p> <p>Speed: Governed to 3200 to 3400 rev. min<sup>-1</sup></p> <p>Cooling: Air cooled</p>
<p><b>Engine Cycle Analyzer</b></p>
<ul style="list-style-type: none"> <li>• Can also be used with other engines fitted with suitable cylinder head transducers and crank angle encoders</li> <li>• Includes powerful Windows-based software specially designed for educational use</li> <li>• Automatic calculation and real-time display of <math>p</math>-<math>q</math> plots and <math>p</math>-<math>V</math> plots and other important parameters</li> <li>• Useful snap-shot, replay and animation functions</li> <li>• Accurate, clear animations of crank, piston, inlet and exhaust valve positions help students visualize the engine cycle</li> </ul>

- Students can export data for further analysis

### Learning Outcomes

When used with suitable test engines, the analyzer allows investigations into a variety of internal combustion engine characteristics, including:

- The thermodynamic cycle of an internal combustion engine
- Calculation of indicated mean effective pressure and indicated power
- Comparison of indicated mean effective pressure and brake mean effective pressure
- Mechanical efficiency of the test engine
- Further work using exported data such as combustion analysis

The output from the hardware unit connects to a computer running the Engine Cycle Analyzer software. The hardware unit includes LED indicators to show the processor readiness, encoder top dead-centre position and PC communication status.

The software provides real-time display of pressure versus crank angle (p-q) and pressure versus volume (p-V) plots. It performs calculations on the data to accurately display indicated mean effective pressure (IMEP) and indicated power for comparison with brake mean effective pressure (BMEP), and brake power to determine the mechanical efficiency of the test engine.

The software has useful snap-shot, replay and animation functions to help students visualize and better understand the engine cycle. The snap-shot and replay allow students to capture several engine cycles and study them using an animation showing the relative position of the crank, piston, inlet and exhaust valves. The software also allows students to create and recall engine configuration files for convenient entry of test engine data needed for calculations such as crank radius and engine swept volume. Data can also be exported to other software for further analysis.

Crank angle input: Shaft encoder with 360 pulses per revolution

Resolution: 1 degree

Pressure signal conditioning: Precision charge amplifier with digital thumb-wheel calibration

Maximum engine speed: 7000 rev. min<sup>-1</sup>

PC connection: Via USB type 1.1 or 2

Auxiliary input: 0 to 10 V via BNC connector

### Versatile Data Acquisition Frame Mounted

#### Key Specifications

- All mains connectors and cables
- STP (shielded twisted pair) cables for equipment connection
- Data Export: – XLSX file (default)
- HTML file (optional)

Software features include:

- Recording data manually or automatically
- Data capture set by time or intervals
- Display of real-time data, in digital form or as an analogue meter
- Real-time traces of analogue signals
- Logging data for printing and later analysis
- Exporting data for use by other software
- Performing real-time calculations to generate user defined data
- Creating and printing charts and data tables
- Customizable layouts

#### Accessories (supplied):

- All mains connectors and cables
- STP (shielded twisted pair) cables for equipment connection

#### Digital Inputs:

- 6 off RJ45 connection
- 4 off SPC (DTI) inputs

#### Analogue Inputs:

- 1 DIN type socket for dual trigger input
- 2 DIN type sockets for signal inputs of 0 to 10 V or 4 to 20 mA

<ul style="list-style-type: none"> <li>• Sample rate up to 25 kHz with 12-bit resolution</li> <li>• Bandwidth/Filter cut-off 3 kHz (nominal)</li> </ul> <b>Data Export:</b> <ul style="list-style-type: none"> <li>• XLSX file (default)</li> <li>– HTML file (optional)</li> </ul>
<b>ADDITIONAL REQUIREMENTS:</b>
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: 5yrs Manufacturer Warranty

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 5:00PM 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:

**MS. MICHELLE A. SUPEÑA**

Bids and Awards Committee Secretariat

NEUST Gen. Tinio St., Cabanatuan City

Telephone No. (044) 463-0226

Email Address: neustmain@yahoo.com

Approved by:

**DR. HONORATO P. PANAHO**

BAC Chairperson