

**SUPPLY, INSTALLATION & TESTING OF VIBRATION
COMPREHENSIVE EXPERIMENTAL TEACHING SYSTEM
(02 numbers).**



**TENDER NO: IMUV/2015-2016/VCETS/LT3 VIBRATION
COMPREHENSIVE EXPERIMENTAL TEACHING SYSTEM/
Dated -15 -02-2016**

**INDIAN MARITIME UNIVERSITY
VISAKHAPATNAM CAMPUS - GANDHIGRAM VISAKHAPATNAM -
530 005
ANDHRA PRADESH**

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SECTION 1
NOTICE INVITING TENDER

- 1.1 Indian Maritime University, Visakhapatnam Campus invites tender for “Supply, Installation & Testing of Two numbers of Vibration Comprehensive Experimental Teaching System”
- 1.2 The Cost of Tender document is `500 (Rupees Five Hundred Only) payable by way of Demand Draft drawn on any Nationalized/Scheduled Bank in favour of Indian Maritime University, Visakhapatnam Campus Payable at Visakhapatnam. The tender document can also be downloaded from the web site www.nsdrc.com/ www.nsdrc.res.in. In such case the cost of tender document shall be submitted along with the Tender
- 1.3 Tenderers are advised to study the Tender Document (including all Sections, Schedules and Annexures etc) carefully. Submission of Tender shall deem to have been done after careful study and examination of the Tender Document with full understanding of its implications.
- 1.4 Sealed tender prepared in accordance with the conditions enumerated in **Section-3** should be submitted to the Director, Indian Maritime University, Visakhapatnam Campus, Gandhigram, Visakhapatnam 530005, not later than the date and time mentioned, at the address given in this section.
- 1.5 All tenders must be accompanied by an Earnest Money Deposit (EMD) of **Rs 13,000 (Thirteen Thousand only)**
- 1.6 This Tender Document is not transferable.
- 1.7 Schedule for Invitation to Tender
 - a) **Name of the Purchaser**
Indian Maritime University
Visakhapatnam Campus
Gandhigram
Visakhapatnam-530005
Andhra Pradesh
Phone: 0891-2578360-64
Fax : 0891-2577754
 - b) **Location where the Equipment to be supplied, Installed and Tested**
Indian Maritime University
Visakhapatnam Campus
Gandhigram
Visakhapatnam-530005
Andhra Pradesh

- c) **Addressee and Address at which Tenders are to be submitted**
Director
Indian Maritime University
Visakhapatnam Campus
Gandhigram
Visakhapatnam-530005
Andhra Pradesh
- d) **Place of issue of Tender document**
Indian Maritime University
Visakhapatnam Campus
Gandhigram
Visakhapatnam-530005
Andhra Pradesh
- e) **Last Date for submission of the Tender**
On or before 1500 Hours on **07th March 2016**
- f) **Place of submission of Tender (Technical and Price Bid)**
Indian Maritime University
Visakhapatnam Campus
Gandhigram
Visakhapatnam-530005
Andhra Pradesh
- g) **Date of opening of Technical Bid**
At 1600 Hours on **07th March 2016**
- h) **Place of opening of Technical Bid**
Indian Maritime University
Visakhapatnam Campus
Gandhigram
Visakhapatnam-530005
Andhra Pradesh, India
- i) **Validity of Tender**
90 days from the date of opening of the Technical Bid.
- j) The date of opening of price bid will be intimated to those bidders by email who qualify in technical bids after technical evaluation of the tenders.
- k) **Date by which the supply to be completed.**
Within **Four weeks** from the date of signing of the agreement.

- 1.8 Clarifications on the specifications, tender conditions etc, if any, will be clarified till submission of the tender. Any queries thereafter will be summarily rejected. For clarification contact email is : pavankumargvv@imu.co.in

- 1.9 The tenderers may be required to make a technical presentation at Indian Maritime University, Visakhapatnam Campus on their offers and their capabilities prior to opening of the price bid. The date of the presentation will be intimated separately to the individual tenderers.

SECTION 2
DEFINITIONS

- 2.1 **Tenderer**: Refers to the Person or the Firm or the Company to whom this Tender is issued.
- 2.2 **Vendor**: Refers to the person or the firm or the Company with whom the order for the Supply, Installation and Commissioning of the Equipment is placed and shall be deemed to include the Vendor's successors, their representatives (approved by the Purchaser), heirs, executors, administrators and permitted assigns, as the case may be, unless excluded by the terms of the Contract. Also referred to as the successful Tenderer.
- 2.3 **Purchaser**: Refers to IMU, Visakhapatnam Campus
- 2.4 The **Consignee** of all the items shall be IMU, Visakhapatnam Campus
- 2.5 **IMU**: Refers to Indian Maritime University, Visakhapatnam Campus.
- 2.6 **Goods**: Refers to all equipment, other accessories, which the successful Tenderer is required to supply to IMU, Visakhapatnam Campus under the Contract as indicated in this Tender.
- 2.7 **Services**: Refers to various Services indicated in this Tender and shall include services ancillary to the supply of the Goods, transportation, insurance and any other incidental services, such as installation, warranty, maintenance for Three years. Service as specified in this tender including the provision of technical assistance for integration of the supplied items and training and any other such obligations of the Tenderer as covered under the tender.
- 2.8 **Items**: Refers to all Goods and Services indicated in this Tender and shall include all accessories which are essential to meet the requirements specified.
- 2.9 **Start Date**: Refers the date on which the order is placed on the successful tenderer and accepted by the successful tenderer.
- 2.10 **Acceptance/Completion Date**: Refers to the date on which all the items along with accessories (as specified in the tender) are supplied, installed & testing is completed and acceptance of the Equipment by IMU.
- 2.11 **RST, RSP** : RST refers to Response Sheet Technical (RST) and RSP refers to Response Sheet Price (RSP)

SECTION - 3

GENERAL CONDITIONS AND DIRECTIONS FOR THE GUIDANCE OF TENDERER

- 3.1 Tenders in sealed cover should be submitted as per the 'Schedule of Requirements' as indicated in **Section-6** in this tender and in accordance with instructions to Tenderers i.e. as per general conditions and directions for the guidance of Tenderer are to be submitted in duplicate to The Director, Indian Maritime University, Visakhapatnam Campus, Visakhapatnam.
- 3.2 Tender must be submitted in one sealed main cover containing Cover I and II separately and the main cover shall be super scribed as for "**Supply, Installation and Testing Of Two numbers of VIBRATION COMPREHENSIVE EXPERIMENTAL TEACHING SYSTEM**". All the covers shall be addressed to the Director, Indian Maritime University, Visakhapatnam Campus, Visakhapatnam - 530 005. Name and address of the Tenderer shall also be written on all covers.
- 3.3 The Tenderer shall clearly write on **Cover-I as Technical Bid & Cover-II as Price Bid** and shall super scribe " Supply, installation & testing of Two numbers of VIBRATION COMPREHENSIVE EXPERIMENTAL TEACHING SYSTEM" on the two covers.
- 3.4 The contents of Techno-Commercial bid are placed at **Annexure 1** and contents of Price bid are placed at **Annexure 2**
- 3.5 The tender shall be submitted in bound form and not in loose sheets.
- 3.6 On the date of opening of technical bid, only the Main Cover and Cover-I (Technical Bid) alone will be opened. Cover-II of various Tenderers will be put in a sealed cover in the presence of the Tenderers or their authorized representatives, who are present on the date of opening of Technical bid.
- 3.7 The price information should only be furnished in Price Bid (Cover II).
- 3.8 Tender documents are not transferable.
- 3.9 The Tenderer shall offer and quote for all items and services indicated in the Tender. Tender responses that do not cover all items shall be summarily rejected.
- 3.10 The Tenderer should enclose in the technical bid, full details of the items offered with full documentation, descriptive literature/leaflets supplementing the description to meet the specification as indicated in the tender. Models and Brands offered shall be clearly indicated including all accessories. All documentation required is to be in English Language. The Tenderer shall clearly indicate OEM part/identification

- numbers for all the equipment and services supplied inclusive of warranty in technical bid.
- 3.11 The Tender should be complete in all respects and if the Tender is incomplete the same may be rejected.
- 3.12 The Tenderer shall sign and affix stamp on all pages of the tender documents and a person, holding a power of attorney authorizing him to do so, shall make such signature. The letter of authorization is to be enclosed along with the covering letter of the technical and price bids.
- 3.13 The Tenderer shall offer the items specified in the Tender document, as the sole agency.
- 3.14 Amendment to Tender Document
- 3.14.1 At any time prior to the last date for receipt of the bids, IMU, may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective Tenderer, modify the Tender Document by an amendment.
- 3.14.2 The amendment will be notified by Post or Fax or E-mail to all the Tenderers who have received the Tender Document and will be binding on them. An amendment notice sent by Fax or a signed confirmation copy through Post will follow E-mail.
- 3.14.3 In order to afford prospective Tenderers, reasonable time in which to take the amendment into account in preparing their bids, IMU may or at its own discretion, extend the last date for receipt of bids.
- 3.15 The amount of Earnest Money Deposit is 13,000 (Rupees Thirteen thousand only) and shall deposit in the form of Demand Draft drawn on any Nationalized/Scheduled Bank in favour of Indian Maritime University, Visakhapatnam Campus payable at Visakhapatnam. The Demand Draft should be enclosed to the Technical Bid and should not be sent separately.
- 3.16 The Earnest Money deposited by the unsuccessful Tenderer will be refunded without any interest on placement of Order on the successful Tenderer. The EMD for the successful Tenderer shall be refunded on submission of Security Deposit equivalent to 10% of the order value (final accepted tender value) in the form of Bank Guarantee.
- 3.17 All the taxes and duties, etc., applicable shall be indicated clearly in price bid. The offers that contain the prices in the technical bid will be invalid and such Tenders will be summarily rejected.
- 3.18 The prices quoted should be on Indian Rupee basis and should include the base price (inclusive of freight, forwarding, Insurance coverage till acceptance and delivery at

IMU Visakhapatnam), installation, testing along with applicable taxes and duties. The taxes and duties, if any, shall be indicated clearly in the Tender and the same shall be taken into account to arrive at the total price for delivery at IMU, Visakhapatnam Campus at Visakhapatnam. IMU does not bind itself to accept claims for extra payment for items not included in the Tender. Any revision in Statutory levies during the period between placement of Order and successful testing of the equipment would be paid by IMU on receiving documentary evidence for such revisions against the information furnished in the Tender.

- 3.19 The Tenderer shall abide by the specifications and terms and conditions as mentioned in this tender.
- 3.20 The successful Tenderer on receipt of the Order shall furnish Security Deposit for 10% of the total value of the order (Final accepted tender value) by way of unconditional irrevocable Bank Guarantee from a Nationalized/Scheduled Bank in the form hereto annexed (**Annexure 3**) within 7(Seven) days from the date of issue of the Order, failing which the Order may be cancelled. Under such event the IMU shall have the right to procure the items at his discretion. On receipt and acceptance of the Bank Guarantee by IMU, Earnest Money Deposit submitted with the Tender will be refunded. No interest will be allowed on the Earnest Money Deposit from the date of its receipt until it is refunded.
- 3.21 EMD of the Tenderer would be forfeited if -
- a) The tenderer is not willing to abide by the terms of conditions after submission of tender.
 - b) The tenderer does not honour the clarifications provided to IMU.
 - c) Withdraws or amends or impairs or derogates from the tender in any respect within the period of validity of its tender before receipt of final acceptance.
 - d) Fails to submit Bank Guarantee as indicated in this tender within the stipulated time. (This is applicable to tenderer whose tender has been accepted)
- 3.22 Tenders will be opened on the day and time as indicated in this document. Eligible Tenderers as above should send letter of authorization with attested specimen signatures of their representatives who are deputed to attend at the time of opening of Tenders. Representative without such authorization letters may not be permitted to be present to witness the opening. (Only one person is authorized to attend on behalf of each Tenderer for Bid Opening).
- 3.23 Offers received through Telegraphic/Fax/E-Mail will be treated as defective, invalid and rejected.
- 3.24 The Specifications of equipment to be supplied refer to the minimum requirements that the Tenderer is required to meet. Tenders in non-compliance of the minimum specifications would be summarily rejected. **The tenderer is required to quote for**

any accessories etc., which are required to make the Equipment fully operational and functional.

- 3.25 Only detailed complete offers received prior to closing time and date of the Tenders will be taken as valid.
- 3.26 Eligibility Criteria for Tenderers
- 3.26.1 The Tenderer shall be capable of meeting the schedule of requirements.
- 3.26.2 The Tenderer should have average turnover of 10 Lakh for the last three years. The annual reports including audited reports shall be enclosed with the technical bid of the tender or a certificate from the chartered accountant for last three years i.e., 2012-13, 2013-14, and 2014-15.
- 3.27 **Placement of Order:**
- 3.27.1 After evaluation and finalization of bids received, IMU would place the Order on the successful Tenderer. The tender will be awarded to the tenderer who is technically qualified and whose value is the lowest. .
- 3.27.2 The date on which the order is placed on the successful tenderer and accepted by the successful tenderer would be treated as the start date.
- 3.27.3 The successful tenderer is required to submit a Bank Guarantee within stipulated period as per the pro-forma attached in **Annexure 3**, for 10% of the Order value (Final accepted value) towards Security Deposit / Performance guarantee. The Bank Guarantee should remain valid for a period of 60 days beyond the date of completion of all obligation of the Supplier, including warranty obligations.
- 3.27.4 IMU reserves right to modify the terms and conditions to the Order, so as to meet contingency situations, which can arise from time to time. Such modifications would be discussed and agreed upon by the successful Tenderer taking into consideration the cost, time and other implications. After finalization of modification, the Order may be suitably amended, if required.
- 3.27.5 IMU reserves right to change quantities or withdraw some of the items from bill of materials before issuing the order.
- 3.28 IMU reserves the right to amend any of the requirements, terms and conditions of this Tender.
- 3.29 Terms of Payment
100% payment will be released on receipt, installation & commissioning, testing and acceptance of the equipment.

SECTION - 4

SPECIAL CONDITIONS OF TENDER

- 4.1 Successful Tenderer shall be responsible for the insurance, safe delivery and installation of the goods at IMU. The successful Tenderer is responsible for all the supplies of goods and services till the acceptance date after which the ownership is transferred to IMU.
- 4.2 In the event of the placement of the Order, the consignment shall be booked in the name of Indian Maritime University, Visakhapatnam Campus, Visakhapatnam-530005. Any demurrage charges that may become payable on account of the Successful Tenderers failure to consign the materials duly, shall be to the successful Tenderer Account.
- 4.3 The time of delivery is important and must be clearly stated in the Tender and strictly adhered to in the event of a tender being awarded. The delivery time would commence from the start date.
- 4.4 In case of delay in the supply, IMU shall issue to the successful Tenderer; a memo in writing, pointing out the delay in the supply and calling upon the successful Tenderer to explain the cause for the delay within 3 days of the receipt of the memo.
- 4.5 If IMU is not satisfied with the explanation offered, the successful Tenderers security deposit may be forfeited and or IMU may withhold payment of pending bills in whole or in part. If the security deposit or any part thereof is forfeited by an order of IMU and such order becomes final, the successful Tenderer shall make good the security deposit or part of such deposit so forfeited within a fortnight thereafter.
- 4.6 If the successful tenderer fails to execute the Supply/Works in all respects within the period specified or within such extended period as may be allowed, the successful tenderer shall pay a sum equivalent to 1% of the value of the total tender price per week (Seven days) or part thereof subject to a maximum limit of 10% of the value of the each of the item tender as liquidated and ascertained damages.
- 4.7 The supply shall be subject to inspection by IMU and IMU's decision as to the acceptance or rejection of any goods as not conforming to specification, shall be final and binding on the successful tenderer. Such of the goods which are rejected shall be removed by the successful tenderer their own expense and replaced by fresh ones within the time frame decided by IMU.
- 4.8 Bank guarantee will be returned only after successful completion of warranty period of three years from the date of acceptance of the equipment.

- 4.9 It must be clearly understood that the prices quoted in the tender are to include everything required to be done as per the specification and the conditions of tender and supply for the proper execution of supply/works although special mention thereof may have been omitted in the specification. The specifications indicated are for minimum and shall include accessories etc required to make the system fully operational.
- 4.10 IMU has the right to change/ withdraw the quantities of any items in the tender prior to signing of contract. The successful tenderer shall agree to supply the additional quantities for the same price and comprehensive warranty in the event the purchaser places a repeat order for some of the items within next six months.

SECTION - 5
OTHER GENERAL CONDITIONS

- 5.1 The Goods/Services to be supplied by the tenderer shall be of the quality or sort specified and in every respect equal and answerable to the specifications sent with the tender and shall be subject to the approval of the IMU.
- 5.2 The Goods/Services are to be delivered at specified place in IMU premises in Visakhapatnam, free of delivery charges as per specified time.
- 5.3 Delivery of Goods/Services will not be considered complete until such goods or materials have been inspected and passed at the place specified for delivery by IMU. The detailed list of components (Equipment and Service) supplied by the tenderer and Bill of Materials shall be provided well in advance for facilitating inspection by IMU.
- 5.4 Rejected Goods/Services shall be removed by and at the expenses of the tenderer within seven days after notice. If not so taken away, the IMU may seize the goods or materials to be removed and charge the tenderer with all expenses incurred in such removal.
- 5.5 The tender or any part share or interest in it shall not be transferred directly or indirectly to any person whomsoever without the written consent of IMU.
- 5.6 It shall be lawful for IMU, without giving any notice to the successful tenderer, to purchase in the open market any goods or materials covered by the tender and if such goods or materials are not available to purchase suitable substitute, as to which, the decision of
- the IMU shall be final and binding on the bidder, in the event of the bidder;
- (a) Having delivered goods or materials not of the contracted quality.
 - (b) Having failed to supply goods or materials within the time specified.
 - (c) Having refused or being unable to supply goods or materials covered by tender either in whole or in part.
- 5.7 In the event of the breach of any of the provisions of contract by the contractor, IMU shall have the right to terminate the tender summarily.
- 5.8 In the event of IMU terminating the contract for breach by the bidder of any of the provisions thereof, the bidder shall be liable for any loss suffered by IMU up to the time of the termination of the contract and for any further loss which the IMU may suffer during the remainder of the period originally covered by the contract.

- 5.9 In the event of the death, insanity or insolvency of the bidder, IMU shall have the right to terminate the purchase order summarily and to purchase in the open market any Goods/ Services covered by the contract. In this case, the bidder shall not be liable for any excess in the price paid, for any such purchases over the tender price. In case of consortium the lead partner should nominate any other consortium member to bear the liabilities, and in case of individual organization the responsibility shall be taken up by the organization itself or by the legal successor.
- 5.10 With every delivery of goods or materials under this purchase order, invoices in triplicate shall be sent by the supplier to the IMU receiving officer who will retain the original and duplicate copy with him, and return the triplicate copy to the supplier with the actual quantities weights and/or number duly acknowledged thereon after the goods or materials have been inspected and passed as per clause therein before mentioned.
- 5.11 Any notice to the successful tenderer shall deemed to be sufficiently served, if given or left in writing at his usual or latest known place of abode or business.
- 5.12 In these conditions unless there is something in the subject or context inconsistent there with words importing the singular shall include the plural and vice-versa words importing the masculine gender shall include the feminine and the words importing persons shall include bodies corporate.

SECTION - 6
SCHEDULE OF REQUIREMENTS

- 6.0 SCOPE
- 6.1 GENERAL
- 6.2 SPECIFICATIONS
- 6.3 INSPECTION & TESTING

6.0 SCOPE

1.1 This specification covers the requirements regarding supply, installation and testing of the test facility for student lab facility along with accessories, spares, etc. complete.

1.2 The vendor shall be responsible for supplying all equipment/accessories and properly installing them as described in this specification. Other details and requirements which are not covered under this specification, but may be necessary to complete the work and/or to fulfill the operation/performance requirement shall be provided by the vendor, who will be responsible for the construction of the complete appliance to the full satisfaction of the owner

6.1 GENERAL

The test facility including all accessories shall be assembled, tested etc. as per relevant Indian, International Standards, and these specifications wherever applicable and as per sound engineering practice.

All the equipment and accessories shall be fixed on the appliance in a compact and neat manner and shall be so placed that each part is easily and readily accessible for use and maintenance.

6.2 SPECIFICATIONS

**VIBRATION COMPREHENSIVE EXPERIMENTAL TEACHING SYSTEM
CONSISTING OF**

S.No	Item Description	Technical Details
1	Vibration Teaching Instrument	The Instrument shall have 2 channels charge amplifier, power amplifier, programmable signal source and 8 channels data acquisition. AC power supply of 220VAC. It shall have a USB interface
1.1	Charge Amplifier	Specification Channel Number: 2 Charge Measuring Range: 10^6 pC Voltage Measuring Range: ± 10 V Input Mode: Charge or Voltage Linearity Frequency Range For charge input shall be from 1 to 20kHz

		<p>For voltage input shall be from 0 to 20kHz Integration Frequency Range for charge amplifier shall be from 1Hz to 150Hz or from 10Hz to 1.5kHz Low-pass filter shall continuously adjustable from 0.1Hz to 50kHz Gain for charge shall be 1, 2, 5, 10, 20, 30, 40, 60, 100, 200, 300, 400, 600, 1000 Gain for voltage shall be 1, 2, 5, 10, 20, 30, 40, 60, 100</p> <p>Function The amplifier is to amplify the signal of piezoelectric accelerometer and force sensor in the hammer.</p>
1.2	Power Amplifier	<p>Specification Output power: 20VA Maximum output voltage: 10V Maximum output current: 450mA Frequency range shall be from 10Hz to 10kHz SNR=70dB Distortion=1%</p> <p>Function To provide power for contact and no-contact exciter.</p>
1.3	Programmable Signal Source	<p>Specification Programmable frequency range shall be from 1Hz to 5000Hz. Output signal shall be a sine wave. Output Amplitude of the sine wave shall be $\pm 5V$</p>
1.4	Data Acquisition	<p>Specification Analog input channel: 8 Maximum sample frequency: 100kHz Resolution: 16Bits Measuring range: $\pm 10V$ Programmable gain: 1 2 4 8 FiFo: 32KB Timer Counter: 8253</p> <p>Interface: USB</p> <p>Function Convert analog input voltage signal into digital signal. Sampled digital signal is used for further signal process and analysis.</p>
2	Experiment Bench	<p>The material of the steel base of the experiment bench shall be steel GB45 (Corresponds to JIS.S45C, ASTM.1045, 080M46, DIN.C45). The size of the experiment steel base shall be about 750\times255mm. The total weight of the experiment bench with all parts is about 75kg. The experiment bench shall be placed on a stable experimental table.</p>

		Unstable table would affect the experimental results.
3	Combination of Simply Supported Beam and Cantilever Beam	<p>Specification</p> <p>Material:SteelGB45 (JIS.S45C,ASTM.1045,080M46,DIN.C45)</p> <p>Surface Treatment: Chrome</p> <p>Dimension: about 725x40x6mm</p> <p>Weight: about 1,350g</p> <p>Function</p> <p>The beam may be changed from simply supported beam into cantilever beam. It shall be the main part of the bench. It may simulate different beam's response of amplitude and frequency in different experiments</p>
4	Contact Exciter	<p>Specification</p> <p>Quantity: 1</p> <p>Maximum exciting force: 10N</p> <p>Maximum amplitude: ± 3mm</p> <p>Frequency range: from 20 to 2000Hz</p> <p>Maximum current: 500mA</p> <p>Coil DC Resistance: 30</p> <p>Weight: about 1.0kg</p> <p>Function</p> <p>The exciter may be fixed on simply supported beam or cantilever beam to make forced vibration of the beam</p>
5	No-contact Exciter with Magnetic Base	<p>Specification</p> <p>Quantity: 1</p> <p>Maximum exciting force:5N</p> <p>Frequency range: from 10 to 1000Hz</p> <p>Maximum current: 300mA</p> <p>with magnetic base</p> <p>Function</p> <p>The exciter is to fixed on a magnetic base. Its magnetic field makes vibration of a steel string. The steel string may vibrate in the shape of two or three degrees of freedom.</p>
6	Oil Viscous Damper	<p>Specification</p> <p>It shall consist of a plexiglass cylinder, hydraulic oil, an oil valve, and a weight block. Its total weight about 2.0kg with oil. Its total height is 150mm.</p> <p>Function</p> <p>The damper may be fixed on simply supported beam or cantilever beam. It may simulate the response of amplitude and frequency of simply supported beam or cantilever beam with or without oil viscous damper</p>
7	Active	Specification

	Isolator	<p>7.1 Rubber Air Damper It shall consists of four rubber air dampers, a DC motor and its speed adjuster. Its natural frequency is about 7.5 ± 1.2Hz, its damping ratio is from 0.1 to 0.18, and its displacement is from 6.5 to 8.5mm.</p> <p>7.2 DC Motor and Eccentric Wheel Power of DC motor shall be 25W. Rotation speed is 1300rpm. The diameter of the eccentric wheel is 85mm. The weight of the eccentric wheel is 360g.</p> <p>7.3 DC Power Supply and Rotation Speed Adjuster Output current shall be 2A. Output voltage is 30VDC. AC Power supply of 220VAC.</p> <p>7.4 The total weight of the active isolator is about 5kg.</p> <p>Function The active isolator may be fixed on the steel base of the experiment bench. It may simulate the reduction effect of the rubber air dampers on the vibration of the motor.</p>
8	Passive Isolator	<p>Specification It shall consists of four rubber air dampers. The natural frequency of the rubber air damper is 8.8 ± 1.2Hz, its damping ratio is from 0.14 to 0.24, and its displacement is from 3.5mm to 5.5mm . The total weight of the passive isolator is 725g .</p> <p>Function The passive isolator may be fixed on simply supported beam or cantilever beam. It may simulate the vibration response of amplitude and frequency of a structure on rubber air damper.</p>
9	Single and Double Absorber	<p>Specification Weight of the wheel shall be about 75g . Length of arm of 68mm . Its total weight about 270g .</p> <p>Function The absorber is adjustable with either one wheel with one arm or two wheels with two arms. The one-wheel system is for single absorber and the two-wheel system is for double absorber. Adjusting the position of wheel(s) may change the absorber's natural frequency and thus change the absorbing effect on the vibration of the main beam.</p>
10	Two and Three Degrees of Freedom Steel String	<p>Specification It shall consists of a steel string with two weight blocks or three weight blocks and two counter weights. The diameter of the steel string of 0.3mm . The weight of each counter weight of 800g .</p> <p>Function It may be excited by no contact exciter & magnetic field to simulate</p>

		intuitively two or three degree of freedom vibration.
11	Piezoelectric Charge Accelerometer and Magnetic Base	<p>Specification</p> <p>Quantity: 1</p> <p>Frequency range: from 1 to 6kHz</p> <p>Maximum measuring range : 5000 m/s²</p> <p>Sensitivity: 50 pC/m/s²</p> <p>Function</p> <p>To measure the accelerating response of simply supported beam or cantilever beam. Collected signal can be used for the calculation of natural frequency and modal shape accelerating response. The magnetic base is used to fix the accelerometer on the beam</p>
12	Impact Hammer with Force Sensor	<p>Specification</p> <p>Quantity: 1</p> <p>Measuring Range: 5000N</p> <p>Sensitivity: 4pC/N</p> <p>Weight: 0.3kg (0.66 lb)</p> <p>Hammer head: Rubber, nylon, aluminum, steel</p> <p>Function</p> <p>It can be used to hit a simply supported beam or a cantilever beam while measuring the response of the hitting force. Measured data is used for modal shape analysis</p>
13	Tools	The bench includes 4 Allen wrenches, 1 adjustable wrench, 1 screwdriver
14	Teaching Software	The software shall be specially designed for such type of teaching instrument. With the help of the software, it must be much easier to perform all experimental tasks mentioned in S.No: 16
15	Computer	A computer shall be provided to perform all experiments of the system.
16	Contents of Experiments	<p>1.1 Measurement of Natural Frequency and Modal Shape of Simply Supported Beam Structure by the Method of Hammer Impact</p> <p>1.2 Measurement of Natural Frequency and Modal Shape of Cantilever Beam Structure by the Method of Hammer Impact</p> <p>1.3 Measurement of Natural Frequency and Modal Shape of Disc Structure by the Method of Hammer Impact</p> <p>2.1 Determination of Damping Ratio (half-power bandwidth method)</p> <p>2.2 Determination of Damping Ratio (Attenuation method)</p> <p>3.1 Signal Processing and Spectrum Analysis (Software Only)</p> <p>3.2 Signal Superimposed (Software Only)</p> <p>4.1 Understanding of Mechanical Vibration</p>

		<p>4.2 Measurement of Amplitude and Frequency of Simple Harmonic Motion</p> <p>4.3 Measurement of Natural Frequency of Vibration System (Lisajours Figure)</p> <p>4.4 Measurement of Natural Frequency of Simply Supported Beam (Method of Sine Wave Sweep)</p> <p>4.5 Measurement of Natural Frequency of Cantilever Beam (Method of Sine Wave Sweep)</p> <p>4.6 Active Vibration Isolation</p> <p>4.7 Passive Vibration Isolation</p> <p>4.8 Vibration with Single Absorber</p> <p>4.9 Vibration with Double Absorber</p> <p>4.10 Vibration With Oil Damper</p> <p>4.11 Beat Vibration</p> <p>4.12 Natural Frequency and Modal Shape of Two or Three Degree of Freedom String</p> <p>4.13 Natural Frequency and Modal Shape of Multi Degree of Freedom String</p>
17	System Manual (Technical, Operation & Maintenance)	
18	Interfacing, Demonstration and Operational Training	

6.3 INSPECTION, TESTING & ACCEPTANCE OF THE EQUIPMENT

- a) The inspection and testing of the equipment shall be carried out at Indian Maritime University up on receipt in presence of the IMUV staff.
- b) The supplier has to demonstrate the functioning of the entire Vibration Comprehensive Experimental Teaching System in total after complete assemble to the capable performing the list of experiments as specified in the specifications at Indian Maritime University, Visakhapatnam Campus.
- c) The inspection, testing and acceptance of the equipment shall be as per the in-house format of IMUV.

ANNEXURE - 1

CONTENTS OF TECHNO-COMMERCIAL BID

1. Covering letter containing
 - a) Tenderer Name & Address
 - b) Letter of authorisation to sign the tender document on behalf of the Firm
 - c) Bid validity
 - d) Confirmation to all clauses of the tender
 - e) Adherence to Prices quoted throughout the tender.
2. EMD in the form of Demand Draft
3. Eligibility Criteria
 - d) Bidders Particulars (**RST-01**)
 - e) Annual Reports for the year 2012-13, 2013-14, 2014-15
 - f) Signed copy of the Tender Document
4. Compliance Statement to specifications (**RST-02**)
5. **Specifications, Brochures, Model, Leaflets etc., of all the equipment supplied along with OEM's Compliance**
6. Items quoted by the Tenderer (**RST-03**)

ANNEXURE - 2

CONTENTS OF PRICE BID

1. Covering Letter containing:
 - a. Tenderer Name & Address
 - b. Bid validity
 - c. Letter of authorisation to sign the tender document on behalf of the Firm
 - d. Adherence to Prices quoted throughout the tender

2. Price Bid (**RSP-01**)

ANNEXURE – 3

PERFORMANCE BANK GUARANTEE FORMAT

ANNEXURE – B
(Ref. Para 7.1 of Chapter 7)

MODEL BANK GUARANTEE FORMAT FOR FURNISHING BMD

Whereas
..... (hereinafter called the "tenderer")
has submitted their offer dated.....
for the supply of
..... (hereinafter called the "tender")
against the purchaser's tender enquiry No.
KNOW ALL MEN by these presents that WE
of having our registered office at
..... are bound unto
(hereinafter called the "Purchaser")
in the sum of
for which payment will and truly to be made to the said Purchaser, the Bank
..... binds itself, its successors and assigns by these presents. Sealed with the
Common Seal of the said Bank this..... day of 20.....

THE CONDITIONS OF THIS OBLIGATION ARE:

- (1) If the tenderer withdraws or amends, impairs or derogates from the tender in any respect within the period of validity of this tender.
- (2) If the tenderer having been notified of the acceptance of his tender by the Purchaser during the period of its validity:-
 - a) If the tenderer fails to furnish the Performance Security for the due performance of the contract.
 - b) Fails or refuses to accept/execute the contract.

WE undertake to pay the Purchaser up to the above amount upon receipt of its first written demand, without the Purchaser having to substantiate its demand, provided that its demand the Purchaser will note that the amount claimed by it is due to it owing to the occurrence of one or both the two conditions, specifying the occurred condition or conditions.

This guarantee will remain in force upto and including 45 days after the period of tender validity and any demand in respect thereof should reach the Bank not later than the above date.

.....
(Signature of the authorized officer of the Bank)
.....
.....
Name and designation of the officer
.....
Seal, name & address of the Bank and address of the Branch

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RST- 01: **ANNEXURE - 4**
RESPONSE SHEET FOR TECHNICAL BID

BID PARTICULARS FOR TENDER No: _____

1. Name of the Bidder _____
2. Address of the Bidder _____

3. Bidder's proposal number and date _____

Signature of the Tenderer with Seal

Date :

Place :

RST-02:

COMPLIANCE STATEMENT

Sl. No	Item Description	Compliance to Specification Yes/No
1	Supply, Installation & Testing of Vibration Comprehensive Experimental Teaching System	

Signature of the Tenderer with Seal

Date :

Place :

RST-03

ITEMS QUOTED BY THE TENDERER
(Item wise Details)

Sl. No	Item Description	Make & Model	Specifications	Qty quoted for
1	Supply, Installation & Testing of Vibration Comprehensive Experimental Teaching System			

ANNEXURE -5

RSP-01

RESPONSE SHEETS FOR PRICE BID

Sl. No	Item Description	Qty	Rate per unit (in Figures and Words)	All applicable Taxes and Duties in %	Amount of all applicable taxes (in Figures and Words)	Total Amount inclusive of all taxes and duties (in Figures and Words)
1	Supply, Installation & Testing of Vibration Comprehensive Experimental Teaching System					
Total Amount in Figures						
Total Amount in Words						

Note: The taxes and duties applicable should be clearly specified by the Tenderer in the Price Bid and charges such as Insurance, Freight and forwarding shall be borne by the Tenderer.

Signature of the Tenderer with Seal

Date :

Place :