



Indian Institute of Technology Jodhpur

N.H. 62, Nagaur Road, Karwar, Jodhpur - 342030, Rajasthan (India)

☎ 0291-2801352 | ✉ office_ee@iitj.ac.in

Website: Department: <https://www.iitj.ac.in/electrical-engineering/> | IITJ: www.iitj.ac.in

INDIAN INSTITUTE OF TECHNOLOGY JODHPUR

Request For Technical Information and Pro Forma Quotations

For Procurement of Set ups for Control Systems Lab (1. Magnetic Levitation 2. Coupled Tanks 3. Active Suspension)

1. Introduction

The Indian Institute of Technology Jodhpur (IIT Jodhpur) intends to procure **Control Systems Lab (1. Magnetic Levitation 2. Coupled Tanks 3. Active Suspension)** for academic and research purposes.

Before initiating the formal procurement process, the Institute invites **Technical Information and Indicative Pro Forma Quotations** from eligible Original Equipment Manufacturers (OEMs) or their authorized representatives.

2. Purpose

The objectives are to:

- Obtain technical information from prospective OEMs/authorized representatives.
- Obtain indicative Pro forma quotations for estimating the procurement cost.

3. Disclaimer

This document is issued **only for obtaining technical information and indicative Pro Forma quotations.**

Submission of information under this proposal:

- shall **not** be treated as a financial bid;
- shall **not** constitute any commitment on the part of IIT Jodhpur to procure the equipment;
- shall **not** confer any right upon the participating firm for award of any future contract;
- Shall **not** automatically qualify the responding firm for participation in any future tender.

The Institute reserves the right to modify the technical specifications, estimated cost, procurement methodology, or procurement timeline based on its requirements.

4. Equipment Details

- Name of Equipment: **Control Systems Lab set up**
 - 1. **Magnetic Levitation** Qty: 02 No's
 - 2. **Coupled Tanks** Qty: 02 No's
 - 3. **Active Suspension** Qty: 02 No's



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- **Broad Functional Requirements (The essential functions or capabilities that the equipment should have, without mentioning a specific make, model, or brand):**

The Indian Institute of Technology Jodhpur intends to procure **three independent Control Systems Laboratory research set-ups** comprising:

1. Magnetic Levitation System
2. Coupled Tanks Process Control System
3. Active Suspension System

These experimental platforms shall be designed for **undergraduate and postgraduate laboratory courses, student projects, doctoral research, sponsored research, industrial consultancy, and advanced research in control engineering, automation, mechatronics, cyber-physical systems, and intelligent control systems.**

Each experimental set-up shall consist of a laboratory-scale physical plant, suitable sensors and actuators, signal conditioning interface, real-time controller, integrated data acquisition (DAQ) system, engineering workstation, control software platform, and all accessories required for implementation, testing, and validation of classical, modern, optimal, adaptive, robust, intelligent, and data-driven control algorithms.

The laboratory platforms shall enable users to study system modelling, parameter identification, controller design, performance analysis, disturbance rejection, stability analysis, state estimation, observer design, and real-time implementation of advanced control strategies.

The broad functional requirements are indicative and may be modified by the Institute after evaluation of the technical information received from prospective suppliers.

1. Technical specifications for Magnetic Levitation Control Setup:

Parameter	Minimum generic requirement
Scope	Complete ready-to-operate setup including plant, sensors, actuators, drive electronics, data-acquisition/real-time control hardware, power supplies, cables and accessories.
MATLAB/Simulink	The setup shall be compatible with MATLAB and Simulink for real-time control, signal acquisition, plotting and data logging. All required drivers, interface blocks, libraries and licences shall be included. Controller models shall be user-editable.
Open control access	Users shall be able to develop and implement their own PID, state-space, observer-based, optimal and nonlinear controllers; operation shall not be restricted to vendor-supplied experiments.
Real-time operation	Minimum closed-loop sampling rate: 5 kHz.
Desirable	Python support through company provided libraries would add more flexibility to the platform capabilities.
Computer interface	USB, Ethernet, PCIe or equivalent commonly used interface. Any mandatory interface hardware shall be included.



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Parameter	Minimum generic requirement
Electrical supply	Suitable for 230 V, 50 Hz, single-phase supply, directly or through supplied power adaptors.
Documentation	User, installation, calibration, maintenance and experiment manuals; plant parameters; mathematical models; and editable example files.
Warranty and support	Minimum three-year comprehensive on-site warranty and assurance of technical support/spares for at least seven years.
System	Laboratory-scale single-axis electromagnetic levitation system with a visibly levitated ferromagnetic object; suitable for studying nonlinear and open-loop unstable dynamics.
Useful motion range	At least 10 mm controlled levitation or air-gap variation.
Measurements	Non-contact object-position measurement with resolution of 0.1 mm or better, and real-time electromagnetic-coil current measurement.
Actuation	Continuously controllable electromagnetic actuator with suitable amplifier, current limiting, thermal protection and disable facility.
Control capability	Implementation of position control, current control, cascaded current-position control, linearized state-space control and nonlinear control.
Parameters	Object mass, coil resistance and inductance, actuator force relationship or force map, sensor calibration and safe operating range to be supplied.
Minimum experiments	Sensor/actuator calibration, nonlinear modelling, equilibrium and linearization, current control, position control, reference tracking and disturbance rejection.

2. Technical specifications for Coupled-Tank Process Control Setup:

Parameter	Minimum generic requirement
Scope	Complete ready-to-operate setup including plant, sensors, actuators, drive electronics, data-acquisition/real-time control hardware, power supplies, cables and accessories.
MATLAB/Simulink	The setup shall be compatible with MATLAB and Simulink for real-time control, signal acquisition, plotting and data logging. All required drivers, interface blocks, libraries and licences shall be included. Controller models shall be user-editable.
Open control access	Users shall be able to develop and implement their own PID, state-space, observer-based, optimal and nonlinear controllers; operation shall not be restricted to vendor-supplied experiments.
Real-time operation	Minimum closed-loop sampling rate: 100 Hz for the coupled-tank setup.
Desirable	Python support through company provided libraries would add more flexibility to the platform capabilities.
Computer interface	USB, Ethernet, PCIe or equivalent commonly used interface. Any mandatory interface hardware shall be included.



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Electrical supply	Suitable for 230 V, 50 Hz, single-phase supply, directly or through supplied power adaptors.
Documentation	User, installation, calibration, maintenance and experiment manuals; plant parameters; mathematical models; and editable example files.
Warranty and support	Minimum three-year comprehensive on-site warranty and assurance of technical support/spares for at least seven years.
System	Bench-top recirculating liquid-level setup with at least two transparent tanks, a reservoir, controllable pump, tubing, valves and leak-containment provision.
Configurations	Reconfigurable plumbing supporting at least two process configurations, such as interacting/cascaded and separately routed or non-interacting operation.
Level range	Each tank shall have a measurable operational level range of at least 200 mm.
Measurements	Independent continuous measurement in each tank; accuracy within $\pm 1\%$ of full scale and effective resolution of 1 mm or better.
Flow variation	At least three interchangeable outlet restrictions or an adjustable outlet valve; manual provision for introducing a flow disturbance are desirable.
Control capability	Manual, open-loop and closed-loop pump operation; single-tank and coupled-tank level control.
Parameters	Tank geometry, level-sensor calibration, pump calibration and outlet-flow coefficients, or procedures to determine them, to be supplied.
Minimum experiments	Sensor and pump nonlinear mass-balance calibration, model, linearization, identification, PI/PID control, set-point tracking and disturbance rejection.

3. Technical specifications for Active Suspension Control Setup

Parameter	Minimum generic requirement
Scope	Complete ready-to-operate setup including plant, sensors, actuators, drive electronics, data-acquisition/real-time control hardware, power supplies, cables and accessories.
MATLAB/Simulink	The setup shall be compatible with MATLAB and Simulink for real-time control, signal acquisition, plotting and data logging. All required drivers, interface blocks, libraries and licences shall be included. Controller models shall be user-editable.
Open control access	Users shall be able to develop and implement their own PID, state-space, observer-based, optimal and nonlinear controllers; operation shall not be restricted to vendor-supplied experiments.
Real-time operation	Minimum closed-loop sampling rate: 2 to 5 kHz.
Desirable	Python support through company provided libraries would add more flexibility to the platform capabilities.
Computer interface	USB, Ethernet, PCIe or equivalent commonly used interface. Any mandatory interface hardware shall be included.
Electrical supply	Suitable for 230 V, 50 Hz, single-phase supply, directly or through supplied power adaptors.



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Documentation	User, installation, calibration, maintenance and experiment manuals; plant parameters; mathematical models; and editable example files.
Warranty and support	Minimum three-year comprehensive on-site warranty and assurance of technical support/spares for at least seven years.
System	Laboratory-scale quarter-car or equivalent active suspension model with sprung and unsprung masses, suspension elements, active actuator and independently controlled road-disturbance input.
Motion	Road-input displacement and sprung-mass movement of at least 40 mm peak-to-peak within safe operating limits.
Excitation	Road actuator capable of sinusoidal, step-like, chirp/sweep and user-defined excitation over at least 0.5-10 Hz.
Measurements	Sufficient sensors to determine road displacement, sprung-mass displacement and suspension/unsprung displacement; displacement resolution 0.1 mm or better; sprung-mass acceleration measurement with range of at least ± 2 g preferred.
Desirable	Also, for active suspension setup, considering higher displacement range and operation at higher frequencies, an acceleration measurement range greater than 2g may be required, so I'd recommend specifying at least for ± 4 g to ± 5 g.
Adjustment	At least one mechanical parameter such as sprung mass, unsprung mass, spring stiffness or damping shall be adjustable, permitting at least two configurations.
Safety	Mechanical end stops, software travel limits, current limiting and readily accessible emergency stop or actuator-disable provision.
Control capability	Comparison of passive/uncontrolled and active operation; implementation of state-feedback, observer-based, LQR/optimal and other user-developed controllers.
Parameters	Masses, spring constants, damping information, actuator constants, sensor calibration and allowable travel limits to be supplied.
Minimum experiments	Free and forced response, frequency sweep, resonance identification, state-space modelling, parameter identification, state feedback, observer/LQR control and passive-versus-active comparison.



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5. Eligibility Criteria

Interested firms should:

- Be an Original Equipment Manufacturer (OEM) or an authorized distributor/dealer.
- Have experience in supplying similar equipment.
- Have adequate installation and after-sales service support in India.

6. Information/Documents to be Submitted

The interested firms shall submit the following (*Annexure-I*):

1. Company Profile.
2. Details of the OEM.
3. Product Brochure/Catalogue.
4. Detailed Technical Specifications.
5. Compliance with the Broad Functional Requirements.
6. List of previous users/clients with installation reports
7. Details of Warranty.
8. Details of After-Sales Service Support.
9. Authorization Letter from OEM (where applicable).
10. Any additional technical information relevant to the offered equipment.

7. Pro forma Quotation

- Interested firms are requested to submit a Pro forma Quotation (*Annexure-II*) along with their Request for Technical Information and Pro Forma Quotations response. Indicative **Pro Forma** quotation in Indian Rupees (INR), including the cost of the equipment, essential accessories, taxes, duties, freight, insurance, Installation, commissioning, training, and any other associated charges. Wherever applicable, the Annual Maintenance Contract (AMC) and/or Comprehensive Maintenance Contract (CMC) charges and spare parts shall be quoted separately as additional charges.
- Expected delivery schedule and other relevant technical and commercial information.

Important Note:

- The **Pro Forma** quotation is required only for cost estimation and budget planning purposes.
- The prices quoted shall be indicative/non-binding.
- The Pro Forma quotation shall not be treated as a financial bid.
- Submission of a **Pro Forma** quotation shall not confer any right or preference in the subsequent procurement process.

8. Presentation/Demonstration

The Institute may invite for a technical presentation or product demonstration. The date and venue shall be communicated separately.



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9. Submission:

Interested firms may submit their Proforma Quotations on or before the due date in sealed cover or through email (as applicable).

The envelope/email should be superscribed as:

"Request for Technical Information and Pro forma Quotations for Procurement of Set ups for Control Systems Lab "

8. Important Dates

Activity	Date
Publication	3 rd August 2026
Last Date for Submission	25 th August 2026
Technical Presentation (if required)	To be informed
Clarification Meeting (if required)	To be informed

10. General Terms & Conditions

1. This **Request for Technical Information and Pro forma Quotations** is issued only for obtaining technical information and **Pro Forma** estimates.
2. The Institute reserves the right to accept or reject any or all responses without assigning any reason.
3. Submission of a **Request for Technical Information and Pro forma Quotations** does not create any contractual obligation.
4. The Institute may seek additional information, technical clarifications, demonstrations, or presentations from any participant.
5. The Institute may modify the technical requirements based on the responses received.
6. The final technical specifications may be prepared by the User Committee after evaluating all **Request for Technical Information and Pro forma Quotations** responses.
7. The subsequent procurement, if any, shall be carried out through an appropriate procurement method in accordance with the GFR 2017 and applicable procurement rules.
8. Participation in this **Request for Technical Information and Pro forma Quotations** does not automatically entitle any firm to participate in or receive any preference during the subsequent tender process.

11. Contact Details

Name: Dr. Deepak Kumar Fulwani

Designation: Professor

Department: Electrical Engineering

Email: df@iitj.ac.in



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Annexure-I

Request For Technical Information and Pro forma Quotations Response Format

1. Name of the Firm:
2. Registered Address:
3. Name of OEM (if applicable):
4. Contact Person:
5. Email:
6. Phone:
7. Product Name and Model:
8. Brief Technical Description:
9. Compliance with Broad Functional Requirements:
10. List of previous users/clients with installation reports:
11. After-Sales Service Details:
12. Any Additional Features:
13. Remarks (if any).

Note: In *Brief Technical Description*, It should contain five separate subsections:

- **Magnetic Levitation Control Setup**
- **Coupled-Tank Process Control Setup**
- **Active Suspension Control Setup**

Each subsection can include:

Scope, MATLAB/Simulink, Open control access, Real-time operation, Desirable, Computer interface, Electrical supply, Documentation, Warranty and support, System, Motion, Excitation, Measurements, Desirable, Adjustment, Safety, Control capability, Parameters, Minimum experiments.



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Annexure-II

Format for Pro forma Quotation

Sl. No.	Description	Amount (INR)
1	Indicative Pro forma quotation in Indian Rupees (INR), including the cost of the equipment, essential accessories, taxes, duties, freight, insurance, installation, commissioning, training, and any other associated charges.	

Warranty Period: _____

AMC/CMC Charges (after warranty): _____

Delivery Period: _____

Authorized Signatory

Name: _____

Designation: _____

Company Seal & Signature