



**INVITATION LETTER**

Package Code: TEQIP-III/2019/ntst/117

Current Date: 29-Jun-2019

Package Name: NITS/TEQIP-III/EEE/01

Method: Shopping Goods

Sub: INVITATION LETTER FOR NITS/TEQIP-III/EEE/01

Dear Sir,

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

S. No.	Item Name	Quantity	Place of Delivery	Installation Requirement (if any)
1	Open Machine Laboratory Trainer	01	NIT Sikkim	YES
2	Electrical Machines Design Software	25(Academic) + 1 (Research) Perpetual Licences		

2. 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.

3. **Qualification Criteria:**

The bidder/supplier should have:

- 3.1. Enclosed an EMD (Earnest Money Deposit) of Rs. 1,00,000/- (Rupees One Lakh Only) in favour of The Director NIT Sikkim in the form of Demand Draft (DD) drawn on any commercial bank payable at Ravangla/Gangtok.
- 3.2. A minimum of 3 years experience of supplying similar items, substantiated by relevant documents.
- 3.3. An average annual turnover of Rs.30 Lakh in last three years.
- 3.4. Not been blacklisted by any Govt. Institution/Organization.

4. **Quotation:**

- 4.1. The contract shall be for the **full quantity** as described above.
- 4.2. The vendors are requested to quote lowest rate for the supply of all the items in the prescribed **Format for Quotation Submission (Annexure-III)**.
- 4.3. Corrections, if any, shall be made by crossing out, initialling, dating and re writing.
- 4.4. All duties and other levies payable by the supplier under the contract shall be included in the unit Price.

- 4.5. Applicable taxes shall be quoted separately for all items.
- NIT Sikkim being a Public Funded Research Institution, vide Notification No. 45/2017-Central Tax (Rate) and No 47/2017-Integrated Tax (Rate) is eligible for concessional rate of GST on purchase of Workstation (Computer). Further concession on customs duty is also available on customs duty vide notification No. 51/96-Cus. DSIR certificate shall be provided by the Institute to claim such concessional rate. Bidders are required to take into account the said concession in the Financial Bid. The concessional rate of GST is 5%. (Annexure–II, DSIR Certificate)**
- 4.6. 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.
- 4.7. The Prices should be quoted in Indian Rupees only.
- 4.8. The vendor should submit trade licence/certificate of Registration (as applicable) in the required business/field, GST registration number and photocopy of the GST registration certificate, the PAN of proprietor/firm/ company with photocopy of the PAN card. Please attach a certificate that the quoted price is not more than that of any govt. organization/Institute in India. This has to be mention in the offer letter clearly.
5. Each bidder shall submit only one quotation.
6. Quotation shall remain valid for a period not less than **45** days after the last date of quotation submission.
7. The quotation should include the following information:
- 7.1. Authorization certificate from the OEM/Principal assuring full guarantee and warrantee obligations during the liability period, for the goods offered.
  - 7.2. The list of clients (IITs, NITs/Central Universities and other reputed Institution) duly supported by copies of purchase order.
  - 7.3. Details of service/supports centres located in India.
8. **Evaluation of Quotations:** The Purchaser will evaluate and compare the quotations determined to be Substantially responsive i.e. which:
- 8.1. are properly signed; and
  - 8.2. Confirm to the terms and conditions, and specifications.
  - 8.3. The vendor should provide complete technical details (printed literature of the manufacturer along with model/make) and the same should be verifiable from the website of the vendor/OEM. Mere copying the technical specification provided in the Annexure-I may lead to cancellation of the bid.
  - 8.4. The Institute reserves the right for pre-inspection of the goods/equipment quoted by the vendor.
9. The Quotations would be evaluated for all items together.
10. **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.

- 10.1. 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.
- 10.2. 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.
11. Performance Bank Guarantee: Performance Security has to be submitted by the successful bidder. A Bank guarantee issued by a Nationalized Bank in India towards PBG for an amount equal to 5% of total order value of purchase order and valid till the period of beyond the 2 months of completion of warranty period should be submitted in favour of **Director NIT Sikkim**. In case, the vendor fails to provide satisfactory service, the PBG is liable to be forfeited.
12. Payment shall be made in Indian Rupees as follows:  
**Satisfactory Delivery & Installation - 70% of total cost**  
**Satisfactory Acceptance - 30% of total cost**
13. Liquidated Damages will be applied as per the below:  
Liquidated Damages per Day Min %: 0  
Liquidated Damages Max %: 10
  - (a) 1% of the total cost for delay up to 15 days;
  - (b) 2% of the total cost for delay more than 15 days but less than 30 days;
  - (c) 5% of the total cost for delay more than 30 days but less than 60 days;
  - (d) 10% of the total cost for delay more than 60 days;
14. **All supplied items are under onsite warranty for 3 years from the date of successful acceptance of items.**
15. You are requested to provide your offer latest by **17:00** hours on **19-July-2019**.
16. Detailed specifications of the items are at **Annexure-I**.
17. Training Clause (if any): **YES (Three Days Training )**
18. Testing/Installation Clause (if any): **YES**
19. Performance Security shall be applicable: **5%**  
Within 07 days (seven) of the completion of order/ work order/contract/, the successful Bidder shall furnish a Performance Guarantee of an **amount equivalent to 5% of the order value**. Performance Guarantee submitted shall be from a Scheduled Commercial Bank only. Performance guarantee in the form of Demand Draft, Fixed deposit receipt/Bank Guarantee in the standard format from a scheduled commercial bank shall only be acceptable. Performance Bank Guarantee should be valid up to 60 days beyond the date of warranty/last date of contract period. In case of failure to submit the performance security, equivalent amount shall be deducted from the bill payable and kept as security.
20. Information brochures/ Product catalogue must be accompanied with the quotation clearly indicating the model quoted for.

21. The vendors should submit the technical and financial bids in a sealed envelope. Sealed quotation to be submitted/ delivered at the address mentioned below:

**The Nodal Office (Procurement),  
TEQIP-III,  
National Institute of Technology Sikkim,  
Barfung Block, Ravangla, South Sikkim  
Pin Code-737139**

22. We look forward to receiving your quotation and thank you for your interest in this project.



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**Dr. Achintesh N. Biswas  
Nodal Officer (Procurement)**

(Annexure – I)**1. Open Machine Laboratory Trainer**

Quantity	Description of items
1(One) set	<p>The trainer must be a complete set of components for the assembling a large number of rotating electric machines, for dc and ac.</p> <p><b><u>Configurations:</u></b></p> <p><b>1. The modules here below described must be supplied with manual in English language.</b></p> <p><b>2. SET OF COMPONENTS</b></p> <p>The set of components must include, at least, the following elements:</p> <p><b>(1)Base plate</b></p> <p><b>(2)Supports with bearing</b></p> <p><b>(3)Coupling joints</b></p> <p><b>(4) Flexible coupling</b></p> <p><b>(5) Electronic speed transducer</b></p> <p><b>(6)Assembling screws</b></p> <p><b>(7) Wrenches</b></p> <p><b>(8) DC stator :</b> The DC stator must be composed of a metal frame supporting the laminated magnetic circuit, with 2 main poles and 2 interpoles, and the electrical windings. The sheet iron pack must be 60 mm long, with internal diameter of 80 mm. On the poles the coils must be wound whose terminals are shown on a suitable educational terminal board.</p> <p><b>(9) AC stator :</b> The AC stator must be composed of a metal frame supporting the laminated magnetic circuit, because interested by a flux variable in time, and the electrical winding. The sheet iron pack must be 60 mm long, with internal diameter of 80 mm and external one of 150 mm and it must present 24 half-closed slots inside of which there must be a double 3-phase winding: the beginnings and the ends of the different phases must be shown outside the stator on a suitable educational terminal board. The winding must be a double layer one of the long coil lap type, with winding span 6 (1÷7). Every slot must contain two coils of 19 turns each of enamelled wire of diameter 1.12 mm.</p> <p><b>(10) DC Rotor with commutator:</b> The DC rotor must be composed of a shaft to which the segment commutator must be fixed and of a magnetic sheet iron pack where 20 semi-closed slots suitable to contain the electrical winding must be set. The sheet iron pack must be 60 mm long, with external diameter of about 80 mm. The winding must be a double layer one of the long coil lap type, with winding span 9 (1÷10).Every slot must contain two coils with two sections of 5+5 turns carried out with enamelled wire of diameter 1.12 mm. The winding must be subordinate to the 40 segments of the commutator on which two brushes supported by a brush holder graze. The brushes must be subordinate to terminals set on two external boards that show the synoptic of the rotor winding.</p> <p><b>(11) Brush holder with 2 brushes.</b></p> <p><b>(12) AC Cage motor :</b> The squirrel cage rotor must be composed of a shaft to which a pack of magnetic sheet irons is fixed, where the slots suitable to contain the rotor winding must be set. The sheet iron pack must be 60 mm long, with external diameter of about 78 mm. To avoid the phenomenon of the motor</p>

crawling in starting phase and to reduce the noise, the slots must be inclined as regards the stator ones. The rotor winding must be composed of the squirrel cage. The cage must be carried out by setting in every rotor slot some conducting bars that are closed in short-circuit at both ends by means of some conducting rings. The rotor winding can be therefore considered a multiphase winding, with a single conductor for pole-phase, so it does not present and its proper pole number but it assumes one that is equal to the stator winding one.

**(13) AC Ring motor :** The ring rotor must be composed of a shaft to which the collector rings and a magnetic sheet iron pack must be fixed: the iron pack must have 21 semi-closed slots suitable to contain the winding. The sheet iron pack must be 60 mm long, with external diameter of about 78 mm. To avoid a noisy mechanical running the rotor slots must be inclined as regards the stator ones. The rotor winding must be composed of coils and it must be two pole three-phase. The winding must be a double layer one of the long coil lap type, with winding span 9 (1÷10). Every slot must contain two coils of 8 turns each of enamelled wire of diameter 1.5 mm. The winding must be star connected and it must be subordinate to the collector rings while the star centre must be internal and not accessible. The terminals of the rotor winding must be accessible by means of the collector rings on which the bushes supported by a brush holder graze. The brushes must be two for each phase and they must be subordinate to an external terminal board that shows the synoptic of the rotor winding.

**(14) Brush holder with 6 brushes.**

**(15)** A magnetic probe shall be foreseen to display the magnetic fields and for the operator safety a transparent covering shall be provided preventing from the accidental contact with the rotating parts.

**(16)** A transparent Plexiglas screen for protection.

### **3. MOTOR-DRIVEN POWER SUPPLY UNIT**

Suitable for supplying variable alternate and rectified direct current, in order to carry on easily all the tests on the electric machines of the laboratory and in general in an electric measuring laboratory. Provided with start push-button with remote control switch, stop push button, key-unlocked emergency mushroom head push-button and differential magnetothermal protection on the mains sockets. Supplied with connector for overspeed protection of the motors. Housed in metallic box with PVC label. Manual control or automatic control through the interface unit. The control devices and the safety connection terminals, according to the IEC standards, must be arranged on the front panel, clearly interconnected through a schematic diagram.

Technical features: Specifications: Output voltages:

variable ac: (i) 3 x 0 - 46 V, 10 A (programmable), (ii) 3 x 0 - 26 V, 14 A (programmable) (iii) standard fixed ac: 220 V, 10 A

variable dc: (i) 0 - 46 V, 14 A (programmable), (ii) 0 - 32 V, 14 A (programmable) (iii) 0 - 42 V, 5 A

The turret must be equipped with the following parts:

LED for AC variable output

LED for DC variable output

Maximum speed protection connector

Manual control potentiometer of the motorized variator  
 Voltage AC or DC selection switch  
 MAN or AUTO selection switch for START - STOP  
 START push-button  
 STOP push-button  
 Key main switch  
 MAN or AUTO selection switch  
 Variable three-phase output switch  
 Variable AC/DC voltage selector  
 Emergency push-button  
 Dc output switch 0 ÷ 42V/5A  
 Variable DC output switch  
 Variator for variable DC output: 0 ÷ 42V/5A  
 DC output magnetothermic protection: 0 ÷ 42V/5A  
 Terminals for the external control of the motorized variator  
 Terminals for the external "start-stop"  
 Variable three-phase output jacks  
 Variable DC output jacks  
 Variable DC output jacks (5A)  
 Power supply: 3 x 380 V + N, 50/60 Hz.

#### **4. ELECTRICAL POWER DIGITAL MEASURING UNIT – (2 PIECES)**

Housed in an aluminium box with PVC label and provided with a panel with safety terminals showing schematic diagram. Measurement in direct current of: voltage, current, power and energy.

Measurement in alternate current of: voltage, current, power, active energy, reactive energy, apparent energy, cosphi and frequency.

Main technical features:

- DC voltage: 300 Vdc
- DC current: 20 Adc
- AC voltage: 450 Vac
- AC current: 20 Aac
- Power: 9000 W
- Power supply: single- phase, 90- 260 V,50/60 Hz
- Communication: RS485 with MODBUS RTU protocol

These didactic panels must be installed on a vertical frame.

#### **5. MECHANICAL POWER DIGITAL MEASURING UNIT**

suitable for direct measurement of motor output torque through load cell and of rotating speed through load cell and of rotating speed through optical transducer, with mechanical power display; provided with direct current variable power supply for the excitation of the braking systems.

Digital readout of the measured quantities that can be interfaced for data acquisition of the electromechanical characteristics of the machines. Supplied with connector for over speed protection of the motors through the connection to the power supply module. Housed in metallic box with PVC label.

Technical features:

- Torque: .999 Nm (1 mV/dgt)
- Speed: 6000 rpm (1 mV/rpm)
- Power: 300 W (1 mV/W)
- DC output: 0-36 V, 2A
- Power supply: 220 V, 50 Hz

Tachometer section

4-digit digital meter;

Auxiliary contact: 1A, 220V, 30W

Torque meter section

150N (15 kg) cell for brakes

Wattmeter section

4-digits digital meter

Power supply section

variable DC power supply

Output voltage: dc, 0 to 220 V

Maximum current: 2 A

Protection: magnetothermic

The module must be equipped with: Protection operation switch

Connector for speed transducer connection

Connector for speed protection connection

Inverting switch for load cell indication

Load cell connector

ADJ potentiometric regulator for load cell zero

GAIN trimmer regulator for load cell gain

Speed signal output terminals

Torque signal output terminals

Wattmeter signal output terminals

dc power supply switch

dc power supply pilot lamp

Magnetothermic protection of the variator

dc power supply voltage variator

## **6. LOAD CELL**

This item must consist in a resistance electronic strain-gauge with 100 N range, to be mounted on the brake unit for measuring the mechanical torque.

## **7. MOTOR-DRIVEN RESISTIVE LOAD UNIT**

Suitable for realizing single or three-phase resistive loads with manual or automatic operation through the interface unit. Housed in metallic box with PVC label.

Resistance: 3 x 60 Ohm Series Resistance: 3 x 7.2 Ohm Current: 3 x 3.3 A

Power supply: 220 V, 50/60 Hz

The module must be equipped with:

Load state signals (increasing - decreasing)

Input terminals of the load



Ground terminal  
Terminals for the connection to the data acquisition system  
Man - auto switch  
Control potentiometer of the load variation  
Load fuses

**8. ADAPTER BRACKET**

It shall consist in a necessary item to connect the locking device, the brake or the drive motor.

**9. LOCKING AND ROTABLE DEVICE**

This item must be suitable for locking and rotating the rotor of slip-ring induction motors in order to obtain an induction regulator and phase transformer.

**10. POLE CHANGING UNIT**

This item shall consist in a switch to change the number of poles on Dahlander motors.

The panel must have 9 bushes + 1 PE and It must be housed in metal box with PVC label.

**11. PARALLEL BOARD**

This item shall consist in a rotating light synchronoscope to perform the parallel connection between synchronous generators or between the alternator and the mains. It must be housed in metal box with PVC label.

**12. ELECTROMAGNETIC BRAKE**

This item shall include a smooth roll rotor and a salient pole stator.

It shall be provided with water level, arms, weight and balance weight for measuring the output torque of the motor.

There shall be the possibility of assembling a load cell.

It must be possible to couple the electrical machine with other electrical machines through a hub and spider elastic gear ring in polyurethane. It must be supplied with a hooked module in aluminium with PVC label and safety terminals for the electrical connection. A schematic diagram must be shown on the hooked module. Each machine must be provided with: (1) a side plate to fix the unit with screws to the universal base through 4 holes where the machine must remain suspended (construction form IM B14); (2) a coupling joint with reflecting strip and with diam. 40mm.

**13. STAR/DELTA STARTER**

This item must be suitable for three-phase squirrel cage induction motors.

The panel must have 9 bushes + 1 PE

**14. STARTING AND SYNCHRONIZATION UNIT**

This item shall consist in a rotor starter for three-phase slip ring motors and excitation device for synchronization with the mains.

The unit must be housed in metallic box with PVC label.

A schematic diagram must allow an easy operation of the unit.

Power supply: 220 V, 50/60 Hz.

### **15. MOTOR DRIVEN POWER SUPPLY UNIT**

Suitable to supply with variable voltage the brake assemblies with manual or automatic operation through the interface unit. Housed in metallic box with PVC label.

Output: 0-48V, 2A max

Power supply: 220 V, 50/60 Hz

### **16. SOFTWARE FOR THE ELECTRICAL MACHINES LABORATORY**

This system shall permit to execute, in an automatic or semi-automatic mode, under the control of the computer, all the tests normally executed inside the Electrical Machines Laboratory.

The system must include:

Control Software

Acquisition Unit

Electrical Instruments

Electrical measurement modules

Mechanical measurement modules

DC and AC power supply

Electric loads

This software shall be designed to detect electrical machines parameter in many working condition, through the data acquisition interface; it must allow the data export, graph tracing and the computation of main parameters not directly acquirable.

It must be possible to perform the following experiments for asynchronous machines:

No load test of the Three-phase Asynchronous Motor

Short circuit test of the Three-phase Asynchronous Motor

Measurement of the internal resistance of a Three-phase Asynchronous Motor

Measurement of the transformation ratio of the Three-phase Asynchronous Motor

Direct test of the Three-phase Asynchronous Motor with electro-magnetic brake

Direct test of the Three-phase Asynchronous Motor with D.C. Generator Brake

It must be possible to perform the following experiments for synchronous machines:

Magnetization Characteristic of a Synchronous Machine

Short-circuit Characteristic of a Synchronous Machine

Measurement of the Winding Resistance of a Synchronous Machine

External Characteristics of the Synchronous Machine

Regulation Characteristic of a Synchronous Machine

No load Test of a Synchronous Machine as a Motor

Parallel of the Synchronous machine with the Main

"V" curve plot of a Synchronous Machine

It must be possible to perform the following experiments for direct current machines: Measurement of the internal resistance of a Direct Current Machine,

	<p>Computation of the conventional efficiency of a D.C. Generator, Magnetization characteristic of a D.C. Generator, External characteristics of the D.C. Generator, Regulation characteristic of the DC Generator, No load test of the Direct Current Motor, Direct test of the Direct Current Motor with Electromagnetic Brake, Direct Test of a D.C. Motor with D.C. Generator Brake. This eTraining Package must cover all the study subjects and the experiment activities to be performed in a computer controlled electrical machines laboratory. It must work with the following types of machines:</p> <ul style="list-style-type: none"> <li>•Single-phase and three-phase transformers</li> <li>•Direct current machines</li> <li>•Synchronous machines</li> <li>•Asynchronous machines</li> </ul> <p><b>17. COMPUTER INTERFACE</b></p> <p>Data acquisition unit with 8 analogue channels. Equipped with 2 relays and 2 analogue outputs. It must be possible to acquire continuous signals or slowly variable up to 100Hz.</p> <p>Description: robust metal construction, USB interface for maximum PC compatibility</p> <p>Clear interface for easy connection understanding</p> <p>Technical Features</p> <p>Direct power supply from USB, total consumption less than 120mA.</p> <p>Nr. 2 relay outputs.</p> <p>Nr. 2 analogue outputs, with:</p> <ul style="list-style-type: none"> <li>12 bit D/A converter</li> <li>Output levels: -10/+10 V</li> </ul> <p>Nr. 8 analogue inputs, with:</p> <ul style="list-style-type: none"> <li>Input levels: -10/+10 V</li> <li>High impedance input amplifier: &gt; 1M<math>\Omega</math></li> <li>12 bit A/D converter</li> <li>zero autotuning</li> <li>Max sample rate: 10 kHz</li> <li>Driver for Windows 10 /latest</li> </ul>
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## 2. Electrical Machines Design Software

<p>25(Academic) + 1(Research) Perpetual Licences</p>	<p>Modelling Capabilities</p> <p>The finite element program should analyse designs in two dimensions. It should include a Pre and Post-Processor environment and analysis modules.</p> <p>The software should be used as a "virtual prototyping" tool, allowing conceptual designs to be tried and tested quickly and easily.</p> <p>The software should be used for both axi-symmetric and Cartesian geometries, if the third dimension is not significant</p> <p>Features include:</p>
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- Automatic finite element mesh generation
- Non-linear, hysteretic and anisotropic materials
- Material data, in the form of BH and Demagnetization data
- Coupling to external circuits
- Functional material properties / functional external circuit drives
- Powerful post-processing including ability to compute energy and power, force and torque, contour maps of any variable, harmonics analysis and particle trajectories.
- Environment for parameterisation and creating custom menus
- Optimisation
- Link to system simulation using Matlab Simulink.

#### PRE and POST-PROCESSOR

The pre-processor should be intuitive to use, interactive software for preparing models ready for analysis. Automatic mesh generation should be included, and the module should be mouse driven using a menu driven user interface.

The post-processor should provide extensive facilities for the presentation and display of the analysis results. These include: Forces, Power, Energy, Harmonic Analysis, Contour Maps, Line Integrals, Color Zoning, Area Integrals, Graphs, and Particle Trajectories.

A scripting language should be included for automation of both pre and post-processors

The software should include modules for the analysis of Electrical machines.

- i) Static electromagnetic fields solver
- ii) Low-frequency time-varying electromagnetic fields solver
- iii) Rotating machines analysis solver
- v) Demagnetization & Hysteresis solver

#### **i) Static electromagnetic field module**

The Static Field Analysis Program should solve for time invariant magnetic or electric fields. The model should include non-linear material permeability or permittivity and either infinite XY or axi-symmetric coordinate systems. Other types of field that are described by a non-linear Poisson equation should also be solved, including current flow, Newtonian flow and static temperature fields.

#### **ii) Low-frequency time-varying electromagnetic fields**

The Steady-state ac Analysis Program should solve eddy current problems where the driving currents or voltages are varying sinusoidally in time. It should analyze skin effect, quasi-non-linear materials, in both XY and axi-symmetric coordinate systems.

The Transient Analysis Program should solve eddy current problems where the driving currents or voltages are changing in time in a predetermined way, including multiple drive functions.

The velocity Analysis Program should solve for eddy currents induced by motion of conducting media with respect to the field. The solution is time invariant, a moving frame of reference is used in the conducting media.

### **iii) Rotating machines analysis solver**

Rotating machine simulation should do transient eddy current simulation to include the effects of rigid body (rotating) motion.

Windings in the model should be connected to external circuits which should be defined through a circuit layout window.

User defined coupling to mechanical equations should be available as well as specification of functional drives to define the action of electronic controllers accounting for position or current feedback.

Coupling to ordinary differential equations should also be added to simulate other rotating components on the same shaft - for example; fans and turbines.

Up to three independently rotating groups should be included in the model.

### **v) Demagnetization & Hysteresis Solver**

The (de-)magnetization and hysteresis solver should model both the magnetization process for hard magnetic materials, and the hysteresis behaviour of soft magnetic materials.

It should Simulate ferromagnetic hysteresis with realistic demands on resource, material data and with good approximation to physical behaviour with the Hysteresis material model.

It Model the magnetization process for hard magnetic materials and remnant magnetization vector when the process is complete. Further demagnetization and remagnetization of the sample in situ can also be simulated

During a non-linear analysis the solver should use a virgin BH-Curve for material magnetization and then secondary 'demagnetization' BH-Curves as the field decreases.

### **Scripting**

The functions of the Pre and Post-Processor should also be accessible via script (macro) files. This scripting should enable parameterized modelling interfaces to be built (including the ability for the user to customize the software with their own dialogs) and standard procedures for results acquisition to be developed. This should ensure that standards for model building and design evaluation should be enforced, and reduces interactive time required by the user to create, solve and post-process models.

The scripting feature should be integrated with the software, and shall use a simple text syntax; it should not require Visual Basic for Applications (VBA). The software should record user interactions with the Pre and Post-Processor to a text file in such a format that the user commands may be re-

constructed from the saved file. The software should provide a bespoke Command Editor that allows the user to access, edit and extend the saved file to produce functional scripts (known as command, or 'comi', scripts). The Command Editor should include a full list of available commands, including conditional commands, commands to generate interactive user input, and commands to provide user output. The Editor should enable complete comi scripts to be run, and enable commands to be run line-by-line. The Editor should also feature syntax highlighting and search and replace features

The software should have an interface to Python (programming language), and allow Python to be accessed from within the software during all phases of the simulation (modelling, solving and post-processing). The interface should be implemented as an extension to the comi programming language, providing enhanced functionality, including that required to perform calculations on simulation user variables and database elements inside a Python environment.

Matlab-simulink interface

If we want to solve a system-level design problem then we can include rotating motion simulations using Opera as a part of the system.

Co-simulation with Simulink allows the Opera and Simulink simulations to exchange data at each Opera time-step (Simulink may do many sub-steps).

Multiple Opera simulations may be included in the same system simulation

**The electromagnetic analysis software should have-specific FEA features such as**

(a) Steady-state AC analysis to allow non-linear materials

(b) Rotating Machine analysis to allow

i) Mechanical coupling including user-specified mechanical load response including position and speed feedback

(ii) Mechanical coupling to allow multiple, user-defined loads acting on the shaft

(iii) Mechanical coupling to allow rigid body mass dynamics definition for connected inertial systems connected to the shaft

(iv) External circuits including

Functional resistors (Resistor value to vary with circuit current, rotor position, frequency, time etc)

Functional power supplies (user defined function describing power Supply As a function of time, frequency, rotor position, power supply current and other parameters)

Electrical Machines Environment

The software should have 2d electrical Machines Environment, it should build motor and generator models rapidly, setup and analysed using parameterized templates. Extensive model customization should be included in the Electrical Machines Environments in order to meet the user's design

	<p>requirements.</p> <p>Standard machines templates should be available in Electrical Machines Environments</p> <ul style="list-style-type: none"><li>• <b>DC</b></li><li>• <b>Induction</b></li><li>• <b>PM Synchronous</b></li><li>• <b>PM external rotor</b></li><li>• <b>Switched Reluctance</b></li><li>• <b>Synchronous Reluctance</b></li><li>• <b>Synchronous</b></li></ul> <p>Standard design calculations should be performed to obtain useful results such as back-EMF, cogging torque, load torque, open and short-circuit curves.</p> <p>Electrical Machines Environments should have direct coupling with the Optimizer which allows the refinement and optimization of designs based on user requirements.</p> <p>Winding Tool</p> <p>The Winding Tool should provide output on winding scenarios which can be used directly with FEA software. The main purpose of this tool should be to help users assess feasibility and optimality of different winding configurations.</p> <p>The Winding Tool should provide users with the following output:</p> <ul style="list-style-type: none"><li>• Optimal winding layout (circular and linear representation)</li><li>• Star of Slots representation</li><li>• Winding factor harmonics</li><li>• Winding mmf harmonics</li><li>• Görges diagram</li></ul> <p>Optimizer</p> <p>The Optimizer should automatically select and manages an extensive family of goal-seeking algorithms to eliminate the need for manual intervention, making optimisation feasible in virtually all design cases.</p> <p>Additional constraints should be added to the optimisation and user specified termination criteria applied. Single or multiple objective functions should be selected. The Optimizer should be used in conjunction with other simulation modules, allowing objective and constraint functions to be any value that should be determined using the post processing facilities.</p>
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**DSIR Certificate**

सूचना का  
अधिकार  
RIGHT TO  
INFORMATION

दूरभाष/TEL : 26962819, 26567373  
(EPABX) : 26565694, 26562133  
: 26565687, 26562144  
: 26562134, 26562122  
फैक्स/FAX : 26960629, 26529745  
Website : http://www.dsir.gov.in  
(आईएसओ 9001:2008 प्रमाणित विभाग)  
(AN ISO 9001:2008 CERTIFIED DEPARTMENT)



सत्यमेव जयते

भारत सरकार  
विज्ञान और प्रौद्योगिकी मंत्रालय  
वैज्ञानिक और औद्योगिक अनुसंधान विभाग  
टेक्नोलॉजी भवन, नया महरौली मार्ग,  
नई दिल्ली - 110016  
GOVERNMENT OF INDIA  
MINISTRY OF SCIENCE AND TECHNOLOGY  
Department of Scientific and Industrial Research  
Technology Bhavan, New Mehrauli Road,  
New Delhi - 110016

सं० टीयू/वी/आरजी-सीडीई/ (1199)/2016

दिनांक: 17-03-2017

महोदय/महोदया,

यह आपके पत्र/आवेदन दिनांक 27-01-2017 के संदर्भ में है जिसमें सरकारी अधिसूचना सं० 51/96 सीमा शुल्क दिनांक 23.7.1996 के अनुसार सीमा शुल्क/केन्द्रीय उत्पाद शुल्क छूट तथा सरकारी अधिसूचना सं० 10/97-केन्द्रीय उत्पाद दिनांक 01.03.1997 के अनुसार केन्द्रीय उत्पाद शुल्क छूट प्राप्त करने, जिसे समय-समय पर संशोधित किया जाता है, के प्रयोजन से सार्वजनिक निधीयत अनुसंधान संस्थाओं अथवा विश्वविद्यालय अथवा भारतीय प्रौद्योगिकी संस्थान अथवा भारतीय विज्ञान संस्थान, बंगलौर अथवा क्षेत्रीय अभियांत्रिकी महाविद्यालय, अस्पताल के अलावा, के पंजीकरण/पंजीकरण के नवीकरण का अनुरोध किया गया है।

इस संबंध में, आपके संदर्भ तथा उपयोग के लिए निम्नलिखित दस्तावेज संलग्न हैं:-

1. पंजीकरण प्रमाण पत्र
2. नियम एवं शर्तें

भवदीया,

*कामिनी*  
(कामिनी मिश्रा)

वैज्ञानिक - एफ/निदेशक





सूचना का  
अधिकार  
RIGHT TO  
INFORMATION

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विज्ञान और प्रौद्योगिकी मंत्रालय  
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MINISTRY OF SCIENCE AND TECHNOLOGY  
Department of Scientific and Industrial Research  
Technology Bhavan, New Mehrauli Road,  
New Delhi - 110016



No. TU/V/RG-CDE(1199)/2016

Dated : 17<sup>th</sup> March, 2017

To,  
The Director  
National Institute of Technology Sikkim  
Barfung Block, Ravangla Sub-Division,  
South Sikkim - 737 139  
Sikkim

**Subject:** Renewal of Registration of Public Funded Research Institutions or a University or an Indian Institute of Technology or Indian Institute of Science, Bangalore or a Regional Engg. College, other than a Hospital\*, for the purposes of availing Customs duty exemption in terms of Govt. Notification No. 51/96-Customs dated 23.07.1996 & 28/03-Customs dated 01.03.2003 and Central Excise Duty Exemption in terms of Govt. Notification No. 10/97-Central Excise dated 01.03.1997 & 28/13-Central Excise dated 01.10.2013 as amended from time to time.

**With Reference:** Your application dated 27 January, 2017 on the above subject, this is the certificate of registration

#### CERTIFICATE OF REGISTRATION

This is to certify that **National Institute of Technology Sikkim, Sikkim** is registered with the Department of Scientific and Industrial Research (DSIR) for purposes of availing customs duty exemptions in terms of Government Notification No. 51/96-Customs dated 23 July, 1996 and Central Excise duty exemption in terms of Government Notification No. 10/97-Central Excise dated 1 March, 1997 as amended from time to time, for research purposes only. The Registration is subject to terms and conditions mentioned overleaf.

This Registration is valid upto **31.08.2021**.

Please acknowledge the receipt.

Yours faithfully,

*Kamini Mishra*  
(K. Mishra)

Scientist - 'F' / Director

\* Certificate of registration is not valid for activities falling within the definition of "hospital" as per notification no. 51/96 – Customs dated 23-07-1996 and No. 10/97 – Central Excise dated 01-03-1997 issued by the Department of Revenue. The institutions are cautioned to go through the notifications before availing duty exemptions under these notifications.

Terms and conditions for registration of public funded research institutions, etc., other than a hospital for the purposes of availing customs/central excise duty exemption in terms of Govt. notifications no.51/96-customs dt.23.7.1996 and no.10/97-central excise dt.1.3.1997 as amended from time to time.

01. The institution should acknowledge receipt of the registration letter by stating that they will abide by the terms and conditions of registration.
02. The registration would be valid for the period specified in the registration letter\*\*. Request for renewal of registration shall be made in the prescribed proforma, at least 3 months before the expiry of the valid registration. Applications received late may not be considered.  
*\*\* However, certificate of registration is not valid for activities falling within the definition of 'hospital' as per notification no. 51/96-Customs dated 23.07.1996 and No. 10/97-Central Excise dated 01.03.1997 issued by the Department of Revenue. The institutions are cautioned to go through the notifications before availing duty exemptions under these notifications.*
03. Brief summary of the R&D activities, status of on-going projects and achievements of the institution shall be submitted to the DSIR at the end of 5(five) years, in case of institution where validity of registration is 10(ten) years. This should include details related to papers published, patents obtained and processes developed, new products introduced, awards & prizes received and copy of the latest Annual Report.
04. The institution should have a broad based research advisory committee (RAC), which should meet at regular intervals for approving, guiding and monitoring the ongoing and future research projects.
05. The institution should have separate budget for research. The institution should utilise the duty exemption facility as per the above-mentioned notifications, for research purposes only. Non-research requirement such as the one for service activities, teaching, training, patient care, etc. should not be procured availing the facility.
06. DSIR will not be responsible for any misuse of the duty exemptions facility using this certificate. The onus of proving that duty exemptions has been availed for research purpose only lies with the Institution.
07. The institutions should introduce a chapter in its Annual Report dealing with the research & development work. This could contain the on-going research projects, achievements during the year, publications, patents if any, etc. The R&D income & expenditure should be separately shown in an annexure/schedule in the statement of accounts in the Annual Report.
08. The registration will entitle the institutions to avail customs/excise duty exemption on purchase of equipment, instruments, spares thereof, consumables etc. used for research & development subject to relevant Government policies in force from time to time. Such exemptions will have to be separately applied for in the prescribed formats. The institutions should also abide by the terms & conditions of the customs & central excise notifications issued/amended from time to time.
09. In case of disposal/sale of R&D equipment, clearance from customs/excise authorities will also be required in view of the applicable notifications under which the equipment was imported /purchased in India.
10. The institution should submit half-yearly returns of the imports and domestic purchases in the month of January and July every year in the proforma issued by DSIR along with details of items, their value & utilisation.
11. Any violation of the terms & conditions mentioned above and/or provisions of taxation in force will make the institution liable to de-registration.
12. The institution will also conform to such other conditions for registration stipulated in the Guidelines, as may be specifically provided in the registration letter and notices placed on department official website (<http://www.dsir.gov.in>) from time to time.

\* \* \* \* \*

(Annexure-III)

**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)	GST and other Taxes payable	
						In %	In figures (B)
<b>Total Cost</b>							

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.: .....