

**INDIAN INSTITUTE OF TECHNOLOGY GOA**

At Goa Engineering College Campus

Farmagudi, Ponda, Goa 403401

E-mail: [purchase@iitgoa.ac.in](mailto:purchase@iitgoa.ac.in)

GSTIN: 30AABAI1653D1ZF

PAN: AABAI1653D

TAN: BLRI08261B

**Enquiry No: IITGOA/2021-22/014**

**Date: 09/07/2021**

IIT Goa invites sealed quotations in two bid form for the supply of below mentioned items.

SI No.	Description of Item	Qty
1	FE Software 2D single user Licenses <b>(Detailed Specifications Attached)</b>	15
2	FE Software 3D single user License <b>(Detailed Specifications Attached)</b>	01

**Terms and conditions:**

1. Quotation must be valid for at least 90 days.
2. The GSTIN should invariably be mentioned in your offer.
3. Kindly attach a compliance certificate along with the technical quote.
4. Prices: Prices should be quoted in INR – F.O.R., IIT Goa basis only.
5. Payment terms: Within 30 days after the delivery and successful installation of items at IIT Goa.
6. Delivery and installation should be made within 4 weeks of getting a confirmed order.
7. It is mandatory for bidders to quote items having Local Content more than 20%. Refer revised Public Procurement (Preference to Make in India), Order 2017 P- 45021/2/2017 – B. E. II dated 04.06.20 issued by DPIIT, Ministry of Commerce and Industry, Govt. of India.
8. Any bidder from a country which shares a land border with India will be eligible to bid in this tender only if the bidder is registered with the Department for Promotion of Industry and Internal Trade (DPIIT).
9. The suppliers shall provide the banking details along with their quote on their letterhead duly signed and stamped.
10. Quotations shall be submitted in two parts;
  - 1) **Part – I (Technical)** should contain all the technical details and specification of the product. It should contain unpriced bid along with terms and conditions, compliance

certificates, proprietary certificates (if applicable), any other certificates/details etc.  
This envelope should be marked as “Technical Bid”

2) **Part -II (Financial)** The financial bid of the above item should be in a sealed envelope marked as “Financial Bid” and should contain financial terms and conditions.

11. IIT Goa reserves the right to accept or reject any or all the bids without assigning any reason in public interest.
12. The successful bidder has to submit a Performance Guarantee Bond for 3% of the Purchase Order value and valid till one year OR up-to warranty period plus sixty days whichever is later from the date of issue of Purchase Order. Performance Guarantee Bond may be submitted within 15 (Fifteen) days from the date of order acknowledgment as a successful bidder.
13. For any clarification, you may kindly contact Dr. Sashidhar Sampathirao (E-mail: [ssd@iitgoa.ac.in](mailto:ssd@iitgoa.ac.in)) and Stores & Purchase Department (email: [purchase@iitgoa.ac.in](mailto:purchase@iitgoa.ac.in)) till 22/07/2021.
14. All sealed quotations must be super scribed with the tender enquiry number and should reach to the Assistant Registrar (Stores & Purchase), IIT Goa, at Goa College of Engineering Campus, Farmagudi, Ponda, Goa, 403 401 by 17.00 Hrs on or before 30/07/2021.

**Sd/-**

**Asst. Registrar (S&P)**

# **Technical Specifications of FE Electromagnetic Software**

1. Number of 2D finite element (FE) software modules required: 15 quantity (on perpetual license basis)

2. Number of 3D FE software modules required: 1 quantity (on perpetual license basis)

3. FE software plugin for Matlab cosimulations required: 1 quantity (on perpetual license basis)

The requirement includes electromagnetic software to handle the designing and simulation of various electromagnetic devices of both 2D and 3D electromagnetics, along with dedicated technical support on electrical machines and drives.

The electromagnetic software should be able to handle the design and simulation of all kinds of electromagnetic applications such as transformers, motors, generators, linear machines, reactors, actuators, shakers, solenoids, sensors, and electromagnetic medical devices.

## **❖ 2D Electromagnetic Solution requirement**

### **GUI**

Changed to scale the bitmaps embedded in the grid cells on high DPI displays.

- The software should have a native geometry modeling capability for modelling the devices.
- Dedicated material library window for accessing the properties of existing material and to create new user defined materials.
- Circuit window for modelling the complex winding circuits.
- Should be able to select and deselect multiple problems for doing analysis.
- File short cut option for accessing the most recently opened files.
- Material Hysteresis editor.
- Automatic detection and healing of geometrical problems.
- Should be able to display the material direction in the model view.
- Selection and editing the properties of single object and multiple objects should be possible.
- Selection and grouping of multiple objects should be possible by both means of keeping the reference objects and by deleting the objects.
- Accessing of Multiple model window and design layout windows for the same model.

### **Machine Modelling**

- Modelling should be possible by using the inbuilt native geometry modelling capability and by importing CAD geometries.
- The software should support the importing of dxf files and CAD format.
- Modelling of both translational and rotational geometry components.
- Modelling of multiple rotating components should be possible.
- Both load driven and velocity driven motion components should be modelled.
- The software should support multiple degrees of freedom motion.
- Able to perform Boolean operations such as union, subtract and intersect components.
- Extracting the edges of a solid geometry/component can be performed.
- Load vs time data for motion analysis should be possible.
- Changing the shape of a component (Distortion) should be performed.
- Shelling of a component.

- Should be able to model various boundary conditions such as
  - Flux Tangential
  - Field Normal
  - Even Periodic
  - Odd Periodic
  - Surface Impedance
  - Thin Plate
  - Perfect Electric Insulator
- Should be able to take into consideration symmetry condition.

### Material modelling:

- The software should have an inbuilt material library consisting of linear, nonlinear, and anisotropic material data types for steel, magnet, coil, and insulation etc.
- Custom material modelling
- New material should be made by using the reference of existing material property or from scratch.
- Nonlinear magnet properties with recoil data and detailed iron loss data of material for accurate prediction demagnetization and saturation effects of machine.
- Addition of anisotropic magnetostriction deformation curves.
- Importing of customer material data for modeling B-H curve or iron loss data should be possible.

### Coils and Circuit modelling

- Modelling of both stranded and solid type of windings.
- Should be able to create multi terminal coils.
- Series and parallel winding modelling by selecting multiple coils.
- Circuit modelling should include switches such as voltage control switch, current control switch and position control switch.
- Coil should have parameters to add additional resistance and inductance.
- Support the modelling and simulation of Litz wire and coil.
- Should include commutator circuit component.

### Meshing

15. Automated meshing for all the components
16. Mesh caching
17. Triangular meshing should support.
18. Creating a new slice mesh based on the solution and zone of an existing mesh.
19. Mesh size can be controlled by the maximum element size and curvature refinement.
20. Mesh refinement using the polynomial order control and adaption method.
21. P & H adaption method for mesh refinement.
22. Visualization of initial 2D mesh and the solution mesh.

## Solving and Post processing

- Software should support various 2D solvers such as
  - Static
  - Time harmonic
  - Transient
  - Transient with Motion
- Jiles-Atherton hysteresis modelling for both 2D EM problems.
- Solver log reports of body, component, seamless, and JxB forces and torques consistent across 2D solves.
- 2D permanent magnet demagnetization models using 3-point BH data or full nonlinear B-H curve.
- Hall effect probe for Simulink plug-in.
- AC Time-Harmonic frequency solver should approximate nonlinearity in the core, supports circuits, multi-terminal coils, and computation of iron losses during solving.
- The software should support both external fields and temperature effects and tracks demagnetization history.
- Parametric analysis.
- Magnetostriction calculation by computing the following force fields.
  - Magnetostriction Nodal Force (volume)
  - Magnetostriction Force Density (volume)
  - Magnetostriction discontinuity Force Density (surface)
- Calculation of nodal forces and force density values on the surface of components.
- Exporting of the surface force density values as UNV file format for doing structural analysis as well as vibro-acoustic analysis.
- Net force calculation on individual components whether they are in contact with other components or not.
- HPC computing capability.
- Field calculation for flux density, current density, demagnetization, hysteresis loss etc.
- Animation of field plot should be possible.
- Field extraction for plotting/ exporting the data values of various fields both in cartesian and polar co-ordinate system should be possible.
- Resistance, inductance, Capacitance matrix calculation.

## Scripting and Co-Simulation

- Software should have the internal functionality for record, run and edit a script file.
- Automatic session log to record all the scripting commands corresponding to all the operations performed in the session.
- Event handling capability for allowing user code to be executed in tandem with application code when certain user hookable scripting events occur.
- Interoperability.
- External scripting with major programs such as Excel, Simulink, Python etc.
- Co-simulation with MATLAB Simulink for doing complex circuit simulation.

## ❖ 3D Electromagnetic Solution requirement

### GUI

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- The software should have a native geometry modeling capability for modelling the devices.
- Dedicated material library window for accessing the properties of existing material and to create new user defined materials.
- Circuit window for modelling the complex winding circuits.
- Should be able to select and deselect multiple problems for doing analysis.
- File short-cut option for accessing the most recently opened files.
- Material Hysteresis editor.
- Automatic detection and healing of geometrical problems.
- Should be able to display the material direction in the model view.
- Selection and editing the properties of single object and multiple objects should be possible.
- Selection and grouping of multiple objects should be possible by both means of keeping the reference objects and by deleting the objects.
- Accessing of Multiple model window and design layout windows for the same model.

### Machine Modelling

- Modelling should be possible by using the inbuilt native geometry modelling capability and by importing CAD geometries.
- The software should support the importing of dxf files and CAD format.
- Modelling of both translational and rotational geometry components.
- Direct importing of electric motors from other FEA tools in 3D format should be possible.
- Modelling of multiple rotating components should be possible.
- Both load driven and velocity driven motion components should be modelled.
- The software should support arbitrary six degrees of freedom motion.
- Adding volume to the single faced sheet model created in external CAD application should be possible.
- Able to perform Boolean operations such as union, subtract and intersect components.
- Extracting the edges of a solid geometry or component should be performed.
- Load versus time data for motion analysis should be possible.
- Changing the shape of a component (Distortion) should be performed.
- Shelling of a component
- Blending feature for adding fillets and chamfers.
- Modelling of 3D end winding profiles such as
  - Racetrack
  - Pre-Formed
  - Straight rectangular solenoid
  - Toroidal rectangular solenoid
  - Lap
  - Saddle

- Should be able to model various boundary conditions such as
  - Flux Tangential
  - Field Normal
  - Even Periodic
  - Odd Periodic
  - Surface Impedance
  - Thin Plate
  - Perfect Electric Insulator
- Should be able to take into consideration symmetry condition.

### **Material modelling:**

- The software should have an inbuilt material library consists of linear, nonlinear, and anisotropic material data types for steel, magnet, coil, and insulation etc.
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- Nonlinear magnet properties with recoil data and detailed iron loss data of material for accurate prediction of demagnetization and saturation effects of machine.
- Addition of anisotropic magnetostriction deformation curves.
- Importing of customized material data for modeling B-H curve or iron loss data should be possible.

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28. Mesh refinement using the polynomial order control and adaption method or any other equivalent method.
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- Resistance, inductance, Capacitance matrix calculation.

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- Automatic session log to record all the scripting commands corresponding to all the operations performed in the session.
- Event handling capability for allowing user code to be executed in tandem with application code when certain user hookable scripting events occur.
- External scripting with major programs such as Excel, Simulink, Python etc.
- Co-simulation with MATLAB Simulink for doing complex circuit simulation.

A hands-on training along with installation support about the required modules with examples is desired.



## FORMAT FOR PERFORMANCE GUARANTEE BOND

(To be typed on Non-judicial stamp paper of the value of Indian Rupees of One Hundred) (TO BE ESTABLISHED THROUGH ANY OF THE NATIONAL BANKS (WHETHER SITUATED AT GOA OR OUTSTATION) WITH A CLAUSE TO ENFORCE THE SAME ON THEIR LOCAL BRANCH AT GOA OR ANY SCHEDULED BANK SITUATED AT GOA. BONDS ISSUED BY CO-OPERATIVE BANKS ARE NOT ACCEPTED.

To,  
The Registrar,  
Indian Institute of Technology, Goa  
Farmagudi, Ponda,  
Goa – 403401

### **LETTER OF GUARANTEE**

WHEREAS Indian Institute of Technology, Goa (Buyer) have invited Tenders vide Tender No..... Dt. .... for purchase of .....  
AND

WHEREAS the said tender document requires that any eligible successful tenderer (seller) wishing to supply the equipment / machinery, etc. in response thereto shall establish an irrevocable Performance Guarantee Bond in favour of “**Registrar, Indian Institute of Technology, Goa**” in the form of Bank Guarantee for Rs ..... (**3% (three percent) of the purchase value**) and valid till **one year or upto warranty period whichever is later** from the date of issue of Performance Guarantee Bond may be submitted within 15 (Fifteen) days from the date of Order Acknowledgment as a successful bidder.

NOW THIS BANK HEREBY GUARANTEES that in the event of the said tenderer (seller) failing to abide by any of the conditions referred in tender document / purchase order / performance of the equipment / machinery, etc. this Bank shall pay to Indian Institute of Technology, Goa on demand and without protest or demur Rs..... (Rupees.....).

This Bank further agrees that the decision of Indian Institute of Technology, Goa (Buyer) as to whether the said Tenderer (Seller) has committed a breach of any of the conditions referred in tender document / purchase order shall be final and binding.

We, ..... (name of the Bank & branch) hereby further agree that the Guarantee herein contained shall not be affected by any change in the constitution of the Tenderer (Seller) and/ or Indian Institute of Technology, Goa (Buyer).

### **Notwithstanding anything contained herein:**

1. Our liability under this Bank Guarantee shall not exceed Rs. ....  
(Indian Rupees ..... only).
2. This Bank Guarantee shall be valid up to .....(date) and
3. We are liable to pay the guaranteed amount or any part thereof under this bank guarantee only and only if IIT Goa serve upon us a written claim or demand on or before ..... (date).
4. This Bank further agrees that the claims if any, against this Bank Guarantee shall be enforceable at our branch office at ..... situated at .....  
(Address of local branch).

Date:

Yours truly,

Signature and seal of the Guarantor:

Name of Bank:

**Instruction to Bank:** Bank should note that on expiry of Bond Period, the Original Bond will not be returned to the Bank. Bank is requested to take appropriate necessary action on or after expiry of bond period.

**UNDERTAKING FOR BID SECURITY**  
(To be issued by the bidder on company's letterhead in lieu of EMD)

To,  
The Registrar,  
Indian Institute of Technology Goa,  
At GEC Campus, Farmagudi, Ponda – Goa

We, M/s ..... (name of the firm), with ref. to enquiry no.

..... dtd ..... hereby undertake that:

- 1) We accept all the terms and conditions of the tender document.
- 2) We accept that, we will not modify our bid during the bid validity period, submit performance guarantee within the stipulated period and honor the contract after award of contract.
- 3) In the event of any modification to our bid by us or failure on our part to honor the contract after final award or failure to submit performance guarantee, our firm may be debarred from participation in any tender/contract notified by Indian Institute of Technology, Goa for a period of one year.

Yours faithfully,

(Signature of the bidder with date and seal)

## DECLARATION OF LOCAL CONTENT

(To be given on company letter head - For tender value below Rs.10 crores)

(To be given by Statutory Auditor/Cost Auditor/Cost Accountant/CA for tender value above Rs.10 crores)

Date:

To,  
The Registrar,  
Indian Institute of Technology Goa,  
At GEC Campus, Farmagudi, Ponda - Goa

Sub: Declaration of Local content

Tender Reference No: \_\_\_\_\_

Name of Tender: - \_\_\_\_\_

Country of Origin of Goods being offered: \_\_\_\_\_

We hereby declare that an item offered has \_\_\_\_\_ % local content. \_\_\_\_\_

“Local Content” means the amount of value added in India which shall, be the total value of the item being offered minus the value of the imported content in the item (including all customs duties) as a proportion of the total value, in percent.

As per Office Memorandum dated 04/03/2021 issued by Ministry of Commerce and Industry, services such as transportation, insurance, installation, commissioning, training and after sales support like AMC/CMC etc. are not considered as local value addition.

“\*False declaration will be in breach of Code of Integrity under Rule 175(1)(i)(h) of the General Financial Rules for which a bidder or its successors can be debarred for up to two years as per Rule 151 (iii) of the General Financial Rules along with such other actions as may be permissible under law.”

Yours faithfully,

(Signature of the Bidder, with Official Seal)