

I-STEM Software Request - Guide Approval Form

User Details

- **Name of Researcher:** Vedang Arvind Badgujar
- **User Type:** ☐ Ph.D. Scholar ☐ Postdoctoral Researcher ☒ Bachelor's ☐ Masters
- **Institution Name:** COEP Technological University
- **Institutional Contact No:**
- **Research Topic:** Design, Multiphysics Modeling, and Thermal Sensitivity Analysis of a Non-Contact Auxiliary Eddy Current Braking System

Software Request Details

- **Software Name:** COMSOL Multiphysics 6.0 (AC/DC Module, Heat Transfer Module, Material Library, CAD Import Module, LiveLink for MATLAB, LiveLink for Simulink)

Justification for Software Request: The requested software suite is vital for executing complete 3D finite-element electromagnetic, kinematic, and thermal simulations for an automotive auxiliary contactless eddy current braking system.

Specifically, our research methodology requires:

- a. **AC/DC Module:** To solve Maxwell's equations, non-linear B-H soft iron core magnetization, multi-turn coil current excitation, and Lorentz-velocity formulations for accurate braking torque and dynamic deceleration calculations without the numerical instabilities of moving meshes.
- b. **Heat Transfer Module:** To evaluate continuous kinetic energy conversion into volumetric Joule heating and model speed-dependent rotational convective boundary layers on the rotor disc.
- c. **Material Library & CAD Import:** To assign temperature-dependent electrical conductivity and non-linear magnetic properties, as well as import the exact experimental dynamometer rotor CAD geometry directly into the simulation environment.
- d. **LiveLink for MATLAB / Simulink:** For post-processing parametric sweeps, torque-speed optimization curves, and integration with vehicle dynamic control models.

Our host institution (COEP Technological University) lacks the specialized multi-module COMSOL licenses necessary to solve and publish these coupled multiphysics models for upcoming peer-reviewed conference dissemination.

Guide/Supervisor Approval

I, Dr. Sangeeta Mundra,
(Guide/Supervisor Name),

- Confirm that the above-mentioned researcher is affiliated with our institution
- Have reviewed the software request and its relevance to the researcher's academic work
- Approve the software request for research purposes

Approval Confirmation

- I approve the software request
- The software aligns with the researcher's research objectives
- The request meets the institutional research guidelines

Guide/Supervisor Signature: _____

Date: 25/8/2026

Official Stamp/Seal:


Assistant Professor
Department of Mechanical Engineering,
COEP Technological University, Pune-5

Important Notes

1. This form must be signed and scanned
2. The scanned copy must be uploaded with the software request
3. Electronic signatures are acceptable if from an official institutional email