



I-STEM Software Request

User Details

- **Name of Researcher:** HARSHITHA U K PAWAR
- **User Type:** Bachelor's
- **Institution Name:** M S Ramaiah University of Applied Sciences
- **Institutional Contact No:** 08049064431
- **Research Topic:** AI-Enabled Structural Health Monitoring with Piezoelectric Sensors

Software Request Details

- **Software Name:** COMSOL Multiphysics, Basic + Advanced Modules
- **Justification for Software Request:**
The requested COMSOL Multiphysics software is essential for the simulation and modelling of piezoelectric sensors used in the project "AI-Enabled Structural Health Monitoring with Piezoelectric Sensors." The software enables coupled-field finite element analysis (FEA) of piezoelectric materials such as PZT-5A, allowing us to study their electromechanical behavior under different loading and damage conditions (healthy, cracked, delaminated, etc.).

This simulation data will form the foundation for our synthetic signal generation pipeline, which supports our machine learning model development for damage classification, severity estimation, and Remaining Useful Life (RUL) prediction. COMSOL's multiphysics environment allows integration of structural, electrical, and material physics, providing accurate and high-fidelity datasets that are otherwise difficult and expensive to obtain experimentally.

Guide Approval

I, Dr. Shreeta Kumari (Guide)

- 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 Signature: Shreeta
05/11/2025

Somashekhar

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