

I-STEM Software Request - Guide Approval Form

User Details

- **Name of Researcher:** Dr. NISANTH. A
- **User Type:** ☐ Ph.D. Scholar ☒ Postdoctoral Researcher ☐ Bachelor's ☐ Masters
- **Institution Name** : NMAM INSTITUTE OF TECHNOLOGY, Nitte, Karkala, Udupi, Karnataka, 574110.
- **Institutional Contact No:** 08258 2 81263
- **Research Topic:** DESIGN AND PERFORMANCE ANALYSIS OF MEMS SENSORS AND ENERGY HARVESTERS

Software Request Details

- **Software Name:** COMSOL Multiphysics
- **Justification for Software Request:**

The proposed research, "Design and Performance Analysis of MEMS Sensors and Energy Harvesters," requires comprehensive multiphysics modeling and simulation of microelectromechanical systems (MEMS). COMSOL Multiphysics is a powerful finite element analysis (FEA) software that provides an integrated environment for simulating coupled physical phenomena such as structural mechanics, electrostatics, piezoelectricity, fluid flow, heat transfer, and vibration analysis, which are essential for MEMS device design and optimization.

The software will be used to:

Design and Model MEMS Sensors: Develop accurate 2D and 3D models of MEMS sensors and analyse their mechanical, electrical, and electromechanical behaviour under various operating conditions.

Performance Evaluation: Study key performance parameters such as sensitivity, resonance frequency, displacement, stress distribution, capacitance variation, and signal response.

Energy Harvester Analysis: Simulate piezoelectric, electrostatic, and electromagnetic MEMS energy harvesters to evaluate power generation capability, conversion efficiency, and output characteristics under different vibration and environmental conditions.

Multiphysics Coupling: Investigate the interaction between mechanical, electrical, thermal, and fluidic domains, which is critical for understanding real-world device performance and reliability.

Optimization and Parametric Studies: Perform design optimization by varying material properties, geometric dimensions, and operating parameters to achieve improved sensor performance and enhanced energy harvesting efficiency.

COMSOL Multiphysics is widely used in academia and industry for MEMS research due to its accuracy, flexibility, and advanced multiphysics capabilities. Therefore, access to this software is essential for achieving the objectives of the proposed research and producing reliable, high-quality research results.

Guide/Supervisor Approval

I, Dr. SUSHMA P S (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: Sushma

Date: 09/06/2026

H O D

Official Stamp/Seal:

Dept. of Electronics Engg. (VLSI Design and Technology)
MRCET Institute of Technology, Nellore

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