

I-STEM Software Request - Guide Approval Form

User Details

- **Name of Researcher:** RAJ KUMAR KALSHYAN
- **User Type:** [☒] Ph.D. Scholar [☐] Postdoctoral Researcher [☐] Bachelor's [☐] Masters
- **Institution Name :** National Institute of Technology Durgapur
- **Institutional Contact No:** +91-343-2546397
- **Research Topic:** Susceptor assisted Microwave processing of materials (Metallurgical & Materials Engineering)

Software Request Details

- **Software Name:** COMSOL Multiphysics (RF Module, Porous Media Flow Module, Metal Processing Module, Heat Transfer Module, Composite Materials Module, Materials Library)
- **Justification for Software Request:** COMSOL Multiphysics provides a unique combination of electromagnetic, thermal, and chemical simulation capabilities essential for modeling the microwave-assisted processing of minerals. Its use is fully justified for this research, as no other software offers comparable accuracy, flexibility, or integration of multiphysics phenomena relevant to susceptor-assisted microwave heating in metallurgical applications.
 - Using COMSOL Multiphysics will enable:
 - Mechanistic understanding of microwave-material-susceptor interactions.
 - Optimization of process design for energy-efficient material synthesis.
 - Quantitative comparison of microwave vs conventional heating.
 - Generation of validated simulation data supporting peer-reviewed publications and thesis work.

Guide/Supervisor Approval

I, Dr. Satadal Ghorai, Associate Professor in Department of Metallurgical and Materials Engineering, National Institute of Technology Durgapur, West Bengal- 713209,

- 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: Satadal Ghorai

Date: 07-10-2025

Official Stamp/Seal:

SATADAL GHORAI
Associate Professor
Metallurgical & Materials Engineering Department
National Institute of Technology
Durgapur - 713209 (W.B.), India