Proposal for announcing seat under the Institute Internship Program

(separate form to be filled for seat under Institute funding and project funding)

1. Name of faculty member proposing: Dr. Nisha Verma
2. Department/Centre: Materials Research Centre
3. Topic on which work is proposed: Synthesizing Ti2C MXene-based electrode material for high-performance supercapacitors.

4. Preferred period of internship (after May 20th): Between _20th May____2024 to _19th July___2024

5. Qualification of student (branch/semester of study): Third year BTech or BS-MS students or Master of Science Student in Physics or related areas.

6. Brief description of work (300-500 words): Amid growing concerns over fossil fuel depletion and global warming, there has been a heightened focus on seeking clean and sustainable energy alternatives. Emerging options such as nuclear, wind, tidal, and solar energy offer promising avenues, with lithium-ion batteries (LIB) and supercapacitors (SCs) emerging as notable solutions for energy storage and conversion. The discovery of MXene, a versatile two-dimensional material encompassing transition metal carbides, nitrides, and carbonitrides, has attracted considerable attention for its potential as an electrode material. This study aims to develop a high-performance positive electrode material composed of MXene-based composites for asymmetric supercapacitors. The synthesized electrode material will undergo thorough evaluation of its electrochemical performance.

7. Expected learning of student (upto 100 words): Understanding the fundamental principles and data analysis of X-Ray diffraction, Scanning electron microscopy, Electrochemical work station and UV visiable spectrometer.

8. Nature of work: (**Experimental**/simulation/mathematical modelling/data collection-analysis etc.): upto 50 words: The project involves the experimental construction of a MXene-based composite using mechanical milling and high-temperature heat treatment techniques. Phase identification will be conducted using X-Ray Diffraction (XRD), while Scanning Electron Microscopy (SEM) will be employed to analyze the microstructure. Additionally, electrochemical characterization will be performed to assess the storage capacity of the composite using an electrochemical workstation.

9. If the seat is under project sponsored category: Yes/**No**
   a) If yes, number of seats announced:
   b) Name and ID no. of project from which stipend is chargeable

Nisha

Signature of faculty member

Name of department/Centre

MRC

Note:

a) Proposing faculty member needs to be available at the Institute during the period internship is offered
b) No extra space or funding than the stipend will be provided by the institute for this purpose

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