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:** Prof. Rohit Bhakar
2. **Department/Centre:** Department of Electrical Engineering
3. **Topic on which work is proposed:** Blockchain based Peer-to-Peer Energy Trading
4. **Preferred period of internship (after May 20th):** Between 27 May 2024 to 26 July 2024
5. **Qualification of student (branch/semester of study):** B.Tech. (Electrical Engineering/Computer Science Engineering/7th Semester), M.Tech. (Electrical Engineering/Computer Science Engineering/3rd Semester)
6. **Brief description of work (300-500 words):** Integration of distributed energy resources necessitates coordinated operation of the power distribution supply chain components, such as distribution system operators, local market operators, energy suppliers, prosumers, and consumers. Local energy sharing supports localized energy balancing to reduce the variability percolating to the upper-level supply chain. The prosumers with rooftop PV can directly trade their energy surplus on a Peer-to-Peer (P2P) basis within their community, thus reducing network losses and the overall cost of providing energy. The end customers of electricity as buyers or sellers optimize their benefits by managing their energy deficit/surplus from local energy markets and retail utility power, while also controlling and operating their flexible loads. This twofold approach of trading in the P2P market and home energy management can ensure grid balancing at the distribution level, and low energy, and low carbon operation at the building level. In smart home-level P2P energy sharing where prosumers can directly participate in bidding strategies to maximize profit. Blockchain networks are used to perform secure, immutable, tamper-proof, and transparent energy transactions in local energy markets operating at different levels. Blockchain-based framework not only facilitates a high privacy-protecting and scalable transactive energy system through distributed data sharing across networks but also provides a trustable and transparent computing platform to users through distributive smart contracts among nodes.

7. **Expected learning of student (upto 100 words):**

   1. The internship aims to provide new insights on home energy management systems, load management, demand response, P2P trading based on a blockchain-based environment, etc.

   2. Development of a control layer as home energy management system for prosumers trading on a P2P platform.

   3. Assessing the performance of the developed P2P energy system via a simulation based setup on small test systems.

8. **Nature of work: (Experimental/simulation/mathematical modelling/data collection-analysis etc.): upto 50 words**

Mathematical Modelling and Data Analysis

9. **If the seat is under project sponsored category:** No

a) If yes, number of seats announced:

b) Name and ID no. of project from which stipend is chargeable

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(Signature of faculty member)

Prof. Rohit Bhakar

Department of Electrical Engineering

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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