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. Rajeev Agrawal
2. **Department/Centre:** Mechanical Engineering
3. **Topic on which work is proposed:** Development of blockchain based approach for health care waste management
4. **Preferred period of internship (after May 20th):** Between 10June 2024 to 07 July 2024

5. **Qualification of student (branch/semester of study):**
   UG (B. Tech. Mechanical Engineering-3rd Year) and PG (Industrial Engineering/Social Science) with NET/M.Phil/Ph.D.

6. **Brief description of work (300-500 words):**
   The blockchain architecture development involved will be utilizing web3 functionalities, essential for Ethereum-based blockchain applications. These include connecting to the Ethereum network, enabling interaction and transaction sending, interacting with smart contracts, managing transactions, and handling account operations. Particularly, smart contracts of healthcare waste management. The smart contract will be structured in facilities, and persons handling waste and its types. Mappings will store waste and facility information, and controlled function will access based on facility types. Blockchain-based architecture for medical healthcare waste management provides an innovative solution to the challenges associated with handling medical waste, ensuring transparency, security, and efficiency throughout the waste management process. Traditional waste management systems often suffer from inefficiencies, lack of transparency, and inadequate tracking mechanisms, leading to improper disposal and potential risks. The blockchain-based architecture will address these challenges by leveraging features such as decentralization, immutability, and transparency. At its core, the architecture consists of a decentralized network of nodes maintaining a copy of the blockchain ledger. Smart contracts automate various waste management processes, recording events like waste generation, collection, transportation, treatment, and disposal on the blockchain. This information becomes immutable once recorded, providing a reliable audit trail for regulatory compliance and accountability. Cryptographic techniques ensure secure and transparent transactions, protecting sensitive information while allowing real-time tracking and monitoring of waste throughout its lifecycle. The architecture facilitates collaboration and information sharing among stakeholders, enabling better coordination of waste management activities between healthcare facilities, waste management companies, regulatory agencies, and other stakeholders. Ultimately, a blockchain-based architecture for medical healthcare waste management offers a comprehensive solution, promoting safer and more sustainable waste management practices while contributing to a healthier environment. Overall, the developed

blockchain architecture will provide a robust framework for managing waste, ensuring transparency, security, and efficient operations through smart contracts and web3 functionalities.

7. **Expected learning of student (upto 100 words):**
   Developing a blockchain-based architecture for healthcare waste management offers students a comprehensive learning experience. They will gain expertise in blockchain technology, smart contracts, and decentralized applications. Understanding healthcare industry regulations and waste management processes, as is learning about data security and privacy. Students also develop skills in project management, problem-solving, and critical thinking. They will consider ethical and social implications while ensuring transparency and accountability in their solutions. Students will apply theoretical knowledge to real-world problems, fostering a well-rounded skill set applicable across various domains such as coding skills for blockchain applications, contract deployment and execution.

8. **Nature of work: (Experimental/simulation/mathematical modelling/data collection-analysis etc.): upto 50 words**
   The student involved will be gaining a practical learnings experience by interacting with the healthcare field experts to collect healthcare waste management data. Also, the blockchain architecture development will make students learn the simulation with a mathematical model in the real world.
9. If the seat is under project sponsored category: Yes/~~No~~
   a) If yes, number of seats announced: 02
   b) Name and ID no. of project from which stipend is chargeable: **"Development of Artificial intelligence enabled sustainable health care waste management system in India" with CPIN: R100014947**

06/01/2024

Dr.Rajeev Agrawal

Signature of faculty member

Mechanical

Name of department/Centre

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