**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. V. Subbaramaiah
2. **Department/Centre**: Department of Chemical Engineering
3. **Topic on which work is proposed**: Enabling Machine Learning Technique for the Advanced Oxidation of Wastewater
4. **Preferred period of internship (after May 20th):** Between June 1, 2024 to July 15, 2024
5. **Qualification of student (branch/semester of study):** B.Tech and M.Tech
6. **Brief description of work (300-500 words):**

The present study to develop the machine learning (ML) techniques to optimize the Advanced Oxidation Process (AOP) for wastewater treatment. The Advanced Oxidation Process (AOP) is a powerful chemical treatment method used in water and wastewater treatment to remove the non-biodegradable organic compounds. AOP involve in the generation of highly reactive hydroxyl radicals (·OH) through the decomposition of oxidants such as hydrogen peroxide ($H_2O_2$), ozone ($O_3$), or ultraviolet (UV) radiation. These hydroxyl radicals react rapidly with organic pollutants, breaking them down into simpler, less harmful compounds through oxidation reactions. AOP is particularly effective in degrading persistent organic pollutants (POPs) and emerging contaminants that are resistant to conventional treatment methods.

Recently, ML has been widely used in various fields such as health care, energy and environmental etc. ML methods, including artificial neural networks (ANN), random forest (RF), and support vector machines (SVM), will be employed to automatically construct analytical models from large and multidimensional datasets. These models will uncover the hidden complex nonlinear relationships, particularly focusing on the influence of process parameters and expected to help us for better understanding of the influencing variables to predict the AOP efficiency. This comprehensive analysis will enable us to identify optimal conditions for maximizing pollutant removal while minimizing energy consumption and chemical usage.

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

   Students will be able to gain soft skills and subject knowledge in several key areas including expertise in machine learning techniques, data analysis, model development, and performance evaluation. Additionally, student will be able to understand Advanced Oxidation Process (AOP) fundamentals and wastewater treatment. Through hands-on experience with real-world data and advanced analytical tools, students will be sharpen their problem-solving abilities and critical thinking skills.

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

   This Study include literature review, experimental, mathematical modelling, and data analysis.

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

   a) If yes, number of seats announced: NA

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

(V. Subbaramaiah)

Signature of faculty member

Name of department/Centre: Department of Chemical Engineering

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