Proposal for announcing seat under the Institute Internship Program

(For seat under Institute funding)

1. Name of faculty member proposing: ***DR. HIMANSHU ARORA***
2. Department/Centre: ***CIVIL ENGINEERING***
3. Topic on which work is proposed: ***APPLICATIONS OF MACHINE LEARNING IN WATER SECTOR***
4. Preferred period of internship (after May 20th): Between ***21st May 2024 to 15th July 2024***
5. Qualification of student (branch/semester of study):
   For BTech: Branch: Civil Engineering/ Agricultural Engineering/ Computer Science and Engineering (with 4th Semester Cleared)
   For MTech: Water Resources Engineering/ Hydrology/ Irrigation Engineering/Hydraulics (2nd Semester Cleared)
6. Brief description of work (300-500 words): ***The internship study is targeted to work in the field of Machine Learning based applications in Hydrology and Water Resources Sector. The hydrological cycle of earth has experienced a tremendous intrusion of anthropogenic activities. Due to which the changes in climate could be observed very clearly. The extreme events like floods and droughts have become more frequent. The reason behind this is expected to be CO2 emissions, rise in temperatures and changes in rainfall patterns. The erratic nature of precipitation has resulted in higher intensity rainfall and subsequently the floods for comparatively shorter durations as it was 30 years ago. The increasing temperatures have resulted in reduction of ice caps and rising sea levels. The soil moistures and eventually the agricultural sector have also been affected by these forcing. On the other hand, a few areas have experienced an increase in amount of rainfall, which shows the positive side of impacts of climate change. Therefore, this study is aimed at capturing the spatio-temporal changes in the components of hydrological cycle (viz. rainfall, evapotranspiration, humidity, wind speed, etc) and employing the machine learning models for predicting and projecting the future scenarios as a consequence of impending climate change. A number of climate change scenarios have been identified by international agencies like Intergovernmental Panel for Climate change (IPCC) considering various possibilities in the future state of earth. For this more than 50 General Circulation models have been developed by elite institutions around the globe, whose outputs (comprising the historical and future projections of hydro-meteorological variables) could be instrumental in major climate change studies. The data generated in this exercise will be employed in implementing the drought and water sustainability analysis. The outcomes of this exercise will enable us to identify and compare the regions that as most affected by the impacts of climate change, which will eventually be helpful to the policy makers/planners in building strategies for stake holders and to prioritize the areas for policy implementation in water sector.***
7. Expected learning of student (upto 100 words): ***The student is expected to learn about how to work with and make use of the tremendous amount of hydro-meteorological data; And to develop the machine learning models for predicting and projecting the hydro-meteorological variables with an emphasis on climate change.***
8. Nature of work: (Experimental/simulation/mathematical modelling/data collection-analysis etc.): upto 50 words
   The work would primarily be based on Data Collection and Analysis, and applying Machine learning algorithms to implement indices-based analysis and prediction of under climate change.
9. If the seat is under project sponsored category: ***NO***
   a) If yes, number of seats announced: ***Not Applicable***
   b) Name and ID no. of project from which stipend is chargeable: ***Not Applicable***

Dr. Himanshu Arora
Department of Civil 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