Report on Expert Session by Dr. Brijesh Yadav

Time: 12.00 PM onwards **Date:** 3rd February 2024

Topic: "Application of Soft Computing in Civil Engineering" **Venue:** Online Google meet

Event Summary

Today on 3/02/2024, GTU Research & Development cell and PG Department of Civil (Structural) Engineering, GSET-GTU organized an insightful expert talk by **Dr. Brijesh Kumar Yadav** on "**Applications of Soft Computing in Civil Engineering."** With over two decades of experience, Dr. Yadav explored the integration of stochastic methods alongside traditional deterministic approaches in civil engineering domain. The lecture aimed to provide an in-depth understanding of how soft computing techniques can be applied to solve complex problems in the field of civil engineering.

Key Points Discussed are as:

Dr. Yadav initiated the lecture by providing a comprehensive overview of soft computing, emphasizing its role in handling uncertainty, imprecision, and approximation in problem-solving.

The core focus of the lecture was on the various applications of soft computing techniques in civil engineering. Dr. Yadav highlighted how these methods can be employed in areas such as structural analysis, geotechnical engineering, construction management, and environmental engineering.

He discussed on how combining simulation techniques with soft computing methods enhances the accuracy and efficiency of civil engineering models by considering specific examples where the integration of these methodologies has led to better predictions and solutions in complex engineering problems.

He highlighted the adaptability of soft computing in handling complex, nonlinear systems that may be challenging for traditional simulation approaches and focused on how soft computing techniques, such as neural networks and genetic algorithms, can be applied to optimize and adapt models to changing conditions. Dr. Yadav discussed the application of fuzzy logic in

structural analysis, illustrating how it can handle imprecise information and uncertainties in numerical modeling. The audience gained insights into how fuzzy logic can enhance the accuracy of structural assessments. He emphasized on how soft computing enables predictive analytics, allowing civil engineers to anticipate and proactively address potential issues in infrastructure projects.

He also discussed the role of soft computing in decision support systems for civil engineering, aiding in informed decision-making throughout the project lifecycle by addressing along the potential challenges associated with the integration of soft computing in civil engineering, such as data quality, interpretability, and ethical considerations.

He interacted with the participants over a discussion about the ethical implications of relying on machine learning models for critical decisions in civil engineering projects by discussing the evolving skill set required for civil engineers in the era of soft computing and simulation.

He has also guided on how educational programs and professional development can be tailored to equip civil engineers with the necessary skills to leverage these methodologies effectively.

Throughout the lecture, Dr. Yadav shared several case studies and real-world examples, providing practical insights into the successful implementation of soft computing techniques in civil engineering projects.

The event fostered a deeper understanding of soft computing's role in advancing civil engineering research development, marking a significant educational experience for all attendees.

The overall key topics covered during the session were as:

1. Procedure discussion on how to conduct the simulation-based approach.
2. System computing and various types of modeling approach in civil engineering?
3. Benefits of programming in the research of civil engineering field.

The discussion highlighted the necessity of both methodologies in the evolving landscape of civil engineering, sparking engaging dialogues on the future of civil engineering with soft computing. Students engaged actively, particularly during the Q&A session, where insightful

questions were posed and answered.

The session was witnessed by 32 participants including PhD scholars, PG scholars and academicians. The event was concluded with thought-provoking remarks from Prof. Dr. J. A. Amin. The event was coordinated by Prof. M. S.Seth and Prof. (Dr.) Kaushik Gondaliya under the guidance of Prof. (Dr.) J. A. Amin, Professor GTU-GSET & Dr. R. A. Thakkar, Director R&D Cell GTU.

Glimpse of the Event