Expert talk on "

THE ROLE OF NANOTECHNOLOGY IN SUSTAINABILITY

Organized by the Department of Physics & Electronics, K.B.N. College,

The Expert talk on **"The Role of Nanotechnology in Sustainability,"** organized on December 21, 2024, by the Department of Physics & Electronics at K.B.N. College, featured Dr. M. Mamatha Kumari, Associate Professor in the Department of Material Science and Nanotechnology at Yogi Vemana University, as the resource person. The lecture aimed to explore the transformative potential of nanotechnology in addressing global sustainability challenges.

Dr. M. Mamatha Kumari began the session by discussing the pressing energy sustainability issues the modern world faces and emphasized the urgent need for innovative technologies to tackle environmental and resource limitations. She explained the significant role nanotechnology plays in advancing energy solutions and creating sustainable systems for the future. The lecture also introduced the concept of nanoscale science, where materials exhibit unique and enhanced properties due to quantum effects that become more prominent at this scale—one nanometer equals one-billionth of a meter. At the nanoscale, the physical, chemical, and biological properties of materials differ greatly from their bulk counterparts, allowing scientists and engineers to manipulate materials with extraordinary precision, leading to breakthroughs in energy, medicine, and environmental science.

Dr. M. Mamatha Kumari highlighted the importance of nanomaterial size and shape, which are key factors in determining their properties. She further elaborated on the concept of photocatalysis, particularly in hydrogen (H_2) production, explaining how nanostructured photocatalysts can efficiently harness solar energy to split water molecules and produce clean hydrogen fuel. This process, with its potential for maximizing energy conversion efficiency, was a focal point of the discussion.

The lecture also addressed the challenges associated with nanotechnology, including scalability, cost constraints, and the environmental impact of nanomaterial production and disposal. Dr. M. Mamatha Kumari stressed the need for continued research to overcome these challenges and make nanotechnology more sustainable and accessible. Applications in water purification, carbon capture, and advanced energy storage systems were also discussed, showcasing the significant contributions of nanomaterials in these areas.

In her closing remarks, Dr. M. Mamatha Kumari encouraged students and researchers to pursue interdisciplinary studies and collaborative projects to drive innovation. She emphasized the importance of bridging theoretical knowledge with practical applications to create meaningful solutions to global challenges. The lecture concluded with an engaging

Q&A session, where students actively interacted with Dr. M. Mamatha Kumari, asking insightful questions on future trends and practical applications of nanotechnology.

The event was attended by Dr. G. Krishnaveni, Principal of K.B.N. College; Sri T. Srinivasu, Secretary & Correspondent of K.B.N. College; Sri P. L. Ramesh, Dr. M. Venteshwara Rao, and Dr. K. Rama Krishna, Vice-Principals of K.B.N. College; Mr. R. Uday Kumar, Head of the Department of Physics & Electronics; Mr. A. H. D. Prakash, Lecturer in Physics; Ms. B. Sruthi, Lecturer in Electronics; and 100 students from various disciplines, including II B.Sc. Physics (Hons), II B.Sc. Electronics (Hons), III B.Sc. (MECS), and II B.Sc. Computer Science (Hons). The Department of Physics & Electronics thanked Dr. M. Mamatha Kumari for her valuable contribution to the success of the event.

INVITATION

PHOTO GALLERY

The Resource Person Dr. M. Mamatha Kumari, Associate Professor in the Department of Material Science and Nanotechnology at Yogi Vemana University,

PARTICIPANTS AT THE PROGRAMME

The Resource Person Was Felicitated By the Principal, Dr. G. Krishnaveni