National Institute of Technology Rourkela

Departmental Seminar

Seminar Title	: Design and Optimization of Hollow Microneedles Patch Based Wearable Transdermal Drug Delivery System
Speaker	: Dr. Prasoon Kumar
Supervisor	: 8105648520
Venue	: Seminar Room
Date and Time	: 07 Feb 2025 (11:30 AM)
Abstract	: Microneedles (MNs) are emerging as a transformative technology in transdermal drug delivery, offering a minimally invasive alternative to traditional hypodermic needles. The current work focuses on design and optimization of hollow microneedle arrays, engineered for precise and efficient drug delivery. Utilizing advanced simulation tools such as COMSOL Multiphysics® and Autodesk Fusion 360™, we investigated various microneedle geometries to access their their mechanical properties, and drug delivery capabilities. Emphasis is placed on optimizing structural integrity and fabrication processes to enhance drug delivery efficiency. The study also examines the impact of microneedle design on skin penetration depth aiming to maximize therapeutic efficacy while minimizing patient discomfort. Thus, this work contributes to the development of next-generation transdermal delivery systems, potentially revolutionizing patient care by offering a minimally invasive, highly effective, drug administration method.