National Institute of Technology Rourkela

Departmental Seminar

Seminar Title	: Urban Modulation of Local Weather Over Geographically Distinct Cities, and Future Prospects
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Venue	: ER303 Class Room
Date and Time	: 13 Aug 2025 (04:05)
Abstract	: The study on urban meteorology, climatology, and extreme weather is quite important when a country aspires to evolve as an advanced economy in future. In this context, urban growth dynamics and future projection over selected Indian cities are analyzed using satellite datasets, relevant spatial metrics, urban density gradient analysis by applying geospatial technology, machine learning (ML), deep learning (DL) approaches, etc., as per the feasibility. A heterogeneous urban growth pattern and sprawling for different cities is noticed with dominance of infill or outlying or sprawling or dispersive or aggregation type. Substantial anthropogenic activities are realized through night light and population density analysis. The urban-induced land use changes when accounted within Weather Research and Forecasting (WRF) model, it is realized that the urbanization can modulate the local weather in various ways. The modulations include UHI effects, rainfall patterns and intensity during thunderstorms and convective rain events, wind patterns, fluxes, moisture variability and atmospheric boundary layer characteristics. At times, the rainfall can generate floods. Such modulations would impact the quality of life over urban areas, which includes water and electricity consumptions, daily activities, health, etc. Therefore, a continuous research on urbanization and its impact on local meteorology, extreme weather or associated climatology, can help providing inputs to disaster management and policy making; thereby, improving the quality of life of inhabitants.