National Institute of Technology Rourkela

Departmental Seminar

Seminar Title	: A Differential Current Unbalance Factor-Based Scheme for Detecting Shunt and High Impedance Faults in Microgrids
Speaker	: Kunal Kumar (521ee1002)
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Venue	: Seminar Room (EE-205)
Date and Time	: 24 Jul 2025 (5:15 PM)
Abstract	: With the growing incorporation of renewable energy sources (RES), microgrids (MGs) have emerged as a key solution, capable of operating in both grid-connected (GCM) and islanded modes (IM) to enhance reliability and flexibility. Due to the high penetration of Inverter-Interfaced Distributed Generators (IIDGs) such as PV and wind systems, fault current levels in microgrids (MGs) become significantly limited. This restricted fault current capability of IIDGs challenges conventional protection schemes, making fault detection and isolation more difficult. This paper proposes a novel Differential Change in Current Unbalance Factor (DCUF) scheme for detecting shunt faults (SFs) and high impedance faults (HIFs) in MGs. The scheme computes the Current Unbalance Factor (CUF) at both ends of the feeder between Buses M and N using positive and negative sequence currents under pre-fault (PRF) and post-fault (POF) conditions. A threshold-based approach ensures accurate fault detection while avoiding misclassification of MG routine operational disturbances. The proposed scheme is tested on a modified IEEE-13 bus system using MATLAB R2023b Simulink and obtained results under various SF and HIF scenarios confirm the method's effectiveness.