National Institute of Technology Rourkela

## Progress Seminar

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| Seminar Title | : Design of High Power Integrated-Based Multiport Converter for Micro-Grid Applications |
| Speaker | : Jayadev Meher ( Rollno : 522ee1002) |
| Supervisor | : Krishna Roy |
| Venue | : EE-401 |
| Date and Time | : 19 Jun 2025 (12.00 pm) |

Abstract : The demand for compact and reliable power conversion systems in high-power applications, such as electric vehicles, renewable energy systems, and industrial power supplies, have led to the development of advanced multiport converter topologies. This work proposes a high-power, simple-designed integrated-based multiport converter, which is useful for the integration of renewable energy sources. A Pico hydro generator, Biomass, and a PV module are taken as input sources, and both AC and DC loads are considered for modelling. A storage element is also connected to a dual active bridge (DAB) converter to stabilize the DC link voltage level. The DAB converter also has bidirectional power flow capability and provides isolation between the input and output sides. With this proposed converter topology, the PV system can operate at maximum power point (MPP) while keeping the DC link voltage constant by a SEPIC converter. At the same time, the output of the Pico hydro generator and Biomass is rectified at a voltage level same as the output of the SEPIC converter used to boost the PV voltage. The converter simulation is carried out using MATLAB/Simulink software. Experimental results validate the effectiveness of the proposed converter in managing power flow and ensuring reliable performance. The proposed multiport converter topology also offers a scalable and flexible solution for next generation high-power systems.