**21st January: 13.00-14.00, Room: C164**

**Speaker: Dr George Konstantopoulos**

University of Sheffield

**Systems & Control: “***Non-linear Control Theory and Applications in Power and Energy*

*Systems”*

**Abstract**

Due to the rapid increase of renewable energy systems penetration to the electrical grid, the stability of the power network is becoming more and more fragile. Since the integration of distributed generation units is achieved using suitably controlled power electronic devices, both the control design and the stability analysis of power electronic converters connected to the grid have become major issues in both control and power research communities.

In this talk, the necessity of non-linear control theory in power electronics and power systems will be presented. Opposed to the traditional linear control techniques that can achieve local stability results and the very complicated existing non-linear controllers that require extensive knowledge of the plant parameters, some recently developed control methods that are completely parameter-free and guarantee non-linear closed-loop system stability will be provided. The generalised structure of these methods will be verified in several applications starting from simple power electronic converters to complete wind power systems and larger power networks with both simulation and experimental results.