**PhD in Information Engineering**

**XXX Cycle**

**Data acquisition and processing systems**

**Course description**

The Course provides the basic elements for the acquisition, distribution and processing of data in an electronic system (e.g. a personal computer).

After reviewing the fundamental parameters (sampling frequency, resolution etc) of the acquisition section, methods to test the acquisition “quality” will be presented. Then, the system capability of moving large quantity of data in an efficient way will be discussed.

 The technologies of modern serial buses, like LVDS, PCIe, RapidIO, SATA, will be taken into consideration and shown to be suitable for distribution of data to powerful processing devices, which are the heart of the last part of the course.

The architectures of devices such as Digital Signal Processors (DSPs), Field Programmable Gate Arrays (FPGAs), Graphics Processing Units (GPUs) and general purpose processors, will be described. Then an example of a complete acquisition and elaboration system will be provided in detail.