ES6151: Embedded Systems Design

AUs: 3
Prerequisites: NIL
Semester 1

This course will introduce students to embedded systems by providing a detailed overview of the important topics in the field. It will introduce typical examples of embedded systems; real time and safety critical issues; constraint-driven design; systems integration; hardware-software partitioning and time-to-market considerations, ISO Standards; the product life cycle and robust embedded systems design. It will examine state-of-the-art in programmable devices, microcontrollers, application specific standard processors; importance of interrupts; reconfigurable logic; system-on-a-chip; finite state machines; dataflow architectures; and distributed embedded systems. Software for embedded systems, including: programming languages and software architectures; interrupt servicing; multi-tasking; task communications and scheduling; verification; hardware-software co-simulation; and real-time operating systems will be introduced.

The course will also review design methodologies, including: techniques for specification; formal models and specification languages for capturing system behaviour; unified modelling frameworks; design analysis; optimisation and implementation; system verification; rapid prototyping; IP-based designs; hardware-software co-design; and quality & performance metrics.