Digital Signal Processor (DSP) have been used in accelerator systems for more than 15 years and have largely contributed to the evolution towards digital technology of many accelerator systems, such as machine protection, diagnostics and control of beams, power supply and motors.
These three lectures aim at familiarising the student with DSP characteristics and processing development. Typical difficulties, problems and choices faced by DSP designers and developers are outlined and hints are given on the best solution.

The first lecture addresses DSP evolution over the years and looks into DSP hardware. In particular, distinctive DSP core components and peripherals are examined.

The second lecture focuses on real-time development flow and in particular on software development and debugging process.

The third lecture analyses code optimisation options and provides guidelines on ways to carry out code optimisation. The lecture then examines some of the choices DSP designers are faced with when devising a new digital system/ In particular, DSP and system architecture choice, together with code design are considered. The system integration phase is also addressed, and recommended practices and guidelines are summarised. Finally, an real-life digital system example is discussed to show how a one can profit from some of the features described during the course.