The success of the ITER project tends to be measured in terms of the fusion Q that can be achieved. While integrated simulations with different transport models predict somewhat different results for the fusion Q, all these simulations agree that the value of Q is critically dependent on the H-mode pedestal properties, such as temperatures and densities at the top of the pedestal. Suppression of anomalous transport at the plasma edge, triggering and dynamics of ELMs are among main physical processes that determine the properties of the pedestal. Several models for the H-mode pedestal and ELMs has been tested within integrated transport codes. In this report, static and dynamic pedestal models are described and compared and results of integrated modeling simulations of ITER, using these pedestal models in the BALDUR and JETTO codes, are presented. Results obtained with a dynamic pedestal and ELM model implemented in the ASTRA code will also be presented. In the ASTRA simulations, computation of local transport includes flow shear stabilization of anomalous transport driven by long-wavelength turbulence and a new MHD stability model based on the BALOO, ELITE and DCON codes is used.