The new design & innovation programme at DTU represents a fundamental rethinking of the standard concepts dominating most engineering educations. The teaching, its background, context and basic educational ideas are presented and discussed in this paper together with the basic ideas of the accompanying research. It is illustrated how the development of particularly the socio-technical dimensions of design and innovation are based on a close observation of the challenges facing industry. The new competences are expected to support modernisation of industrial methods and organisational schemes in innovation and product development.