Abstract
The main aim of this seminar is to introduce a set of novel experimental and analytical methods used to determine the mechanical properties of composite materials and to assist in the design of composite structures. The talk will address the main aspects of 3D Digital Image Correlation technique, the back-out of properties method and the probabilistic structural analysis methods.

3D Digital Image Correlation (DIC) is an optical non-contact technique that allows to measure strains on deforming bodies. This technique is an ideal solution to study inhomogeneous strain fields developed in complex geometries such as automotive or aircraft components when subjected to a specific loading situation. The lamina properties back-out is a method to the derive elastic and strength properties of unidirectional lamina and allows to overcome some of the difficulties encountered in conventional uniaxial testing and reduces the cost of testing and improves the accuracy of strength predictions. Probabilistic structural analysis methods provide a means to quantify the inherent risk of a design and assess the sensitivities of design variables. The probabilistic approach provides a way to overcome the shortcomings present in the current deterministic approach and offers potential benefits for their use in the design of composite and biocomposite material structures.