This ELSO training manual is directed at intensivists, surgeons, pediatricians, residents, perfusionists, nurses, and ECMO (extracorporeal membrane oxygenation) technologists involved in the care of patients with respiratory or cardiac failure which may require extracorporeal support. It provides specific information on the mechanics of ECMO, the equipment required, the physiology of extracorporeal support, and the management of patients supported on ECMO. Current results of ECMO and alternative support options are also reviewed in some chapters of this book. The authors’ goal is to present clin both intra- and inter-subject averaged prole have been reported on a wide variety of kine-matic, kinetic and EMG variables. The major benet of such a technique is that the averaged waveform is more reliable and the variation about the mean gives us additional information as to the randomness of the variable. For example, in gait the intra-subject lower limb joint angles have minimal variability, while the moment proles at these same joints are quite variable. This phenomenon has resulted in a covariance analysis, which can readily be done; we can calculate the mean variance at each of the join.