While the application of enzymes to synthetic and industrial problems continues to grow, the major development today is focused on multi-enzymatic cascades. Such systems are particularly attractive, because many commercially available enzymes operate under relatively similar operating conditions. This opens the possibility of one-pot operation with multiple enzymes in a single reactor. In this paper the concept of modules is introduced whereby groups of enzymes are combined in modules, each operating in a single reactor, but with the option of various operating strategies to avoid any complications of nonproductive interactions between the enzymes, substrates or products in a given reactor. In this paper the selection of modules is illustrated using the synthesis of the bulk chemical, gluconic acid, from lignocellulosic waste.