This thesis is devoted to the design of error-correcting codes to combat the most crucial errors that arose from modern communication and data storage systems such as deletions, insertions, and tandem duplications. Our target is to investigate coding techniques to deal with burst errors, i.e. those errors that occur at adjacent positions. For each type of errors, we propose constructions of burst error-correcting codes that achieve better sizes compared with previous known results, and we also provide efficient error decoders to recover codewords from errors with linear-time complexity. Special attention is given to the case of burst deletion-correcting codes in permutations and multipermutations. Here, such codes improve the reliability and memory endurance of non-volatile memories such as flash memories.