In Chapter 1, we present a brief introduction of spectra of graphs and some definitions. Chapter 2 is a brief review of energy of graphs and digraphs. We study the problem of real numbers which cannot be the energy of a digraph. In Chapter 3, we study the problem of minimal energy in unicyclic signed graphs. We also construct pairs of equienergetic signed graphs. In Chapter 4, we have introduced the concept of energy in signed digraphs. We characterize unicyclic signed digraphs with minimal and maximal energy. We extend the concept of non extended p-sum (NEPS) to signed digraphs and study its spectra. We obtain upper bounds for the energy of signed digraphs. We also construct pairs of non cospectral equienergetic signed digraphs. In Chapter 5, we obtain a sufficient condition for the even coefficients of the characteristic polynomial of a bipartite signed digraph to alternate in sign and in this case we show it is possible to compare the energy of bipartite signed digraphs by means of a quasi-order relation defined on coefficients. We also obtain a sufficient condition for all the even coefficients of a bipartite signed digraph to be nonnegative. We construct integral, real and Gaussian signed digraphs and quasi-cospectral digraphs.