A group contribution method is proposed to accurately estimate multi-component mixtures. A temperature impact is introduced in viscosity of both pure components and mixtures. Excess Gibbs energy in the Grundberg-Nissan equation is determined as functions of group contribution, temperature and component mole fraction. Experiments of different mixture systems were conducted to fit those parameters for the mixture viscosity. The modeling was able to accurately predict mixture viscosity of based on pure components and binary systems. Extended model on viscosity, heat capacity and aqueous solubility are developed. Verifications based on experimental data are done to get more accurate results. Since chemical properties play an increasingly important role in chemical engineering field, using mathematical model to accurately predict viscosity is of more promising in engineering.