Teacher beliefs that relate to teachers’ motivation and performance have been an important area of concern for science education at all levels. This study focused on investigating science self-efficacy beliefs and the factors associated, and the relationship between the changes in science self-efficacy beliefs and changes in physical science conceptual understanding in a specialized elementary physics content course for elementary education majors (N=51). The data were collected using science self-efficacy beliefs survey, physical science concept instrument, class observations, interviews and artifacts. The data analysis procedures included a pre-post, repeated measures multivariate analysis of variance (MANOVA) design, and grounded theory approach. Results indicated statistically significant gains in participants’ science self-efficacy beliefs. Additionally, a positive moderate relationship between science conceptual understandings and personal science teaching efficacy beliefs was found. Participants’ responses indicated positive shifts in their science teacher self-image and confidence to teach science in future. Findings suggest that despite of the nature of prior science experiences preservice elementary teachers previously had, an exposure to a course that integrates relevant science content along with modeled instructional strategies can positively impact science self-efficacy beliefs. These findings have important implications for preservice science teacher preparation programs.