In this talk we will discuss various aspects of a course redesign of Precalculus at a small public liberal arts college with a large Native American student population. Because of a very wide range of student preparedness, this course has traditionally been problematic due to low student success rates among STEM majors. Redesign of the course included adjustment of the curriculum, changes in in-class assessment methods, and implementation of online assessments. Analysis of the success of this course redesign will include analysis of student learning, success rates, and student attitudes. This work was funded by a U.S. department of Education Title III grant. (Received September 21, 2010)