In 2009-10 two graduate programs for teachers were initiated at the U of U: one that would in addition provide an initial licensure, and the other for cohorts of in-service teachers. Research indicated that M.S. programs neither in mathematics nor mathematics education were serving the profession well, and there was a general call for designing programs in which mathematics and teaching would not be treated as two separate disciplines. On this basis, we conceived of a program grounded in mathematics, guided by the content of CCSS, directed to deepening the candidates’ understanding of the mathematical and pedagogical structure that underlies the standards. While the content was broadly on school mathematics, the intellectual demand was clearly at the level of graduate study. The courses grounded the mathematics in the context of teaching, and challenged students’ understanding of both mathematics and teaching, as well as that of learners of mathematics. We maintained several purely content courses that provided a perspective of mathematics as a live, developing field of study. We shall discuss the structure of the program as it has evolved over this five year period, and illustrate with specific illustrations from several classes. (Received September 02, 2015)