Mathematics Courses
Each of the four 4-unit core mathematics courses—The Number Line, Algebra, Geometry, and Probability and Statistics—will follow the same basic structure, team taught by a University Partner and a School Partner as described previously. Each will have an emphasis on how logic and proof undergird the mathematics and provide meaning and life to it, and each will incorporate technology and applications to other fields as appropriate. There will be two units of mathematics instruction, and two units devoted to how to teach the mathematics.

Mentoring

Mathematics Mentoring Methods (1 unit)
This is a 15 hour, one-unit course on mentoring in the mathematics classroom, open to middle and high school mathematics teachers, which integrates adult development and learning theory with methods to improve leadership development and organizational effectiveness.

Mathematics Professional Development Models (2 or 3 units)
The Mathematics Mentoring Methods course or equivalent life experience is a prerequisite. Participants will serve as auxiliary personnel in the Center of Recruitment and Retention’s Mathematics Teacher Induction Program for middle and high school teachers. The Teacher Induction Project aims to retain middle and high school teachers new to mathematics education. First year mathematics teachers are paired with mentor teachers at their site, and attend 9 monthly Saturday sessions throughout the school year, lasting 5 hours each, which include elements to deepen mathematical knowledge, model good teaching, promote cooperative learning, examine multiple approaches to problem solving, emphasize multiple representations and connections, incorporate NCTM Principals and Process Standards, and connect mathematical topics across 6–12 grade levels. In addition to the support provided by their mentor, each new teacher is observed monthly by one of several coaches. These coaches are exemplary former teachers who focus on those topics most recently presented in the Saturday sessions.

Master’s students will meet with Induction Program personnel to plan these sessions and will assist in the sessions. The planning will include examination of content appropriate materials, alignment with grade-level state and national standards in mathematics, consideration of relevant research, assessment of teacher needs, discussions of best practices, and a format to share ideas, materials and concerns.

An optional one-unit extension will provide the opportunity for these teachers to shadow Induction Program coaches as they observe, provide feedback and mentor Induction Teachers during the spring semester.

Education courses
This component includes two existing courses

Mathematics 506A—Research on the Learning of Mathematics (3 units)
Introduction to research on student learning of K-12 mathematics; cognitive and social theories of knowledge development; application of research in mathematics classrooms.

Educational Leadership 504—Disciplined Inquiry in Education (3 units)
Introduction to research methods in education: analysis of research; writing of research reviews; applying research results in educational settings.

In addition, we will work with CEMELA faculty to develop a course on Language and Culture in the Teaching of Mathematics.
Fieldwork
Fieldwork will consist of either a practicum or a thesis, conducted at the student’s school in conjunction with their teaching that year. The topic will be chosen in conjunction with a faculty advisor, who will ensure that providing students with more challenging courses and curricula is the key criterion.

Practicum
Students fulfilling the practicum option will design, implement, and evaluate a series of mathematics lessons related to a particular topic and grade level of their choosing. For example, a student might design and implement a series of lessons aimed at developing middle school students’ ability to select and use appropriate statistical methods to analyze data. In preparation for designing the lessons, students will investigate related literature including research on student learning of the topic, relevant standards set by national, state, and professional organizations, resources available for teaching the topic, and the prior knowledge of students to whom the lessons will be taught. Evaluation of the lessons will be based in analysis of the development of students’ understandings. The final product of this work will be a unit of instruction consisting of (1) a discussion of relevant literature, standards, and resources, (2) revised lesson plans with assessment instruments, and (3) reflections about the process of developing and teaching the unit.

Thesis
Students fulfilling the thesis option will conduct research in their own classrooms related to an aspect of mathematics teaching and/or learning. The thesis will consist of an introduction, a review of relevant literature, a statement of the problem or question(s) to be investigated, a description of the research methods to be used, results, and implications for teaching, learning, and future research. For example, a student interested in teaching geometry with technology might investigate the ways students utilize The Geometer’s Sketchpad to make, test, and prove conjectures about properties of quadrilaterals.