SECONDARY MATHEMATICS EDUCATION PROGRAM
CONCEPTUAL FRAMEWORK

Major Themes
- developing content knowledge
- developing pedagogical-content-knowledge
- exposure to excellent teaching
- obtaining general educational knowledge
- providing developmentally appropriate field experiences
- observing and developing professional dispositions

The certification program in secondary mathematics at Lock Haven University correlates with the LHUP Teacher Preparation Conceptual Framework by providing the opportunities and experiences necessary for beginning teachers to reflect on the perspective of secondary schools and the profession in general. At the heart of Lock Haven’s Secondary Mathematics Education Program is the vision that has been set forth by the National Council of Teachers of Mathematics (NCTM), the principal professional organization for mathematics education, the Pennsylvania Department of Education (PDE), and the United States Department of Education (USDE). These three entities help in (and often dictate) the modification of the existing program. Indeed, teaching to meet the goals and the visions of these three organizations requires a great deal of reflective decision making, because what students learn depends to a large extent on how it has been learned. Consequently, this certification program strives to blend the learning of mathematics with the learning of pedagogy specific to the teaching of mathematics.

In addition to the visions of these three entities, other organizations such as the National Council for the Accreditation of Teacher Education (NCATE), the Interstate New Teacher Assessment and Support Consortium (INTASC), and the International Society for Technology in Education (ISTE) have set rigorous standards which provide guidance and governance for Lock Haven University’s Secondary Mathematics Education Program. It is Lock Haven’s Secondary Mathematics Education Program’s goal to make the best use of these professional organizations in helping to develop and maintain a program that will produce excellent teachers of mathematics. To that end, the Department of Mathematics has created a program that includes opportunities and experiences that meet the standards of the above mentioned organizations.

The Department of Mathematics at Lock Haven University is deeply concerned with the teaching and learning of mathematics and the importance of developing excellent secondary mathematics teachers for the future. The faculty strives to lead students to grasp both the beauty and power of mathematical ideas and to prepare the prospective teacher to teach creatively using constructivist, diverse learning, and multicultural educational theories.

Effective teachers are those who deeply know the content they are teaching. Effective teachers are those who stimulate their students to learn. Effective teachers are those who are reflective problem solvers themselves, and who can create an atmosphere in which their students can become reflective problem solvers.
In Lock Haven University’s Secondary Mathematics Education program, students will carefully examine the core content knowledge needed for a Bachelor of Science degree in mathematics. Students will study this content through a problem solving process, using reasoning and proof, communication, multiple representations, and making connections within mathematics and with outside disciplines. The study of this mathematics will often occur through the utilization of appropriate technology.

In addition to the careful examination of the core content knowledge needed for a B.S. in mathematics, students in this Secondary Mathematics Education track will have the opportunity to examine specific mathematics education concepts. These concepts include a careful study of the methods used to properly teach mathematics (pedagogical-content-knowledge) and an in depth analysis of the secondary curriculum from an advanced standpoint. In the Secondary Mathematics track, students are prepared to examine and critically evaluate the coherence of a curriculum in terms of how it reflects central and important mathematics and to reflect on its articulation across grade levels.

While observing and studying excellent teaching in the content area of mathematics, students also spend time studying many aspects of education in general. These aspects include the psychology of the learner, classroom management issues, technological media in the classroom, and the social foundations of the United States system of education. These courses are imperative in that they help the mathematics education student place their content area into the larger scope of the educational process.

“Teaching mathematics well is a complex endeavor, and there are no easy recipes for helping all students learn or for helping all teachers become effective” (NCTM, 2000, p.16). However, in order to ease the tension that exists between being a student and becoming a teacher, Lock Haven University’s Secondary Mathematics program provides ample opportunity for its students to gain experience, support, and encouragement during this transition, beginning with an early field experience. Effective mathematics teachers cultivate a challenging and supportive classroom environment; effective teachers engage their students in real problem-solving activity; effective mathematics teachers are reflective when it comes to their teaching and have sufficient—and sufficiently supported—access to professional development (Grouws, Cooney, and Jones, 1988; National Commission on Teaching and America’s Future, 1996).

The Secondary Mathematics Education Program at Lock Haven University believes that conceptual understanding, factual knowledge, and procedural facility are all important aspects of learning mathematics. By combining instruction in university-level mathematics with instruction in pedagogy, and making the connection among content, pedagogy, and secondary mathematics, this program prepares beginning teachers to make the kinds of decisions that lead to students’ willingness to engage in mathematical activity as well as to their achievement.

Finally, the Secondary Mathematics Education Program at Lock Haven University believes that professionalism is a key factor in the success of a teacher. Speaking appropriately and properly to peers, those in authority, and students is a key to being an excellent teacher. Being prompt, prepared, appropriately dressed, and enthusiastic about the topics at hand are also attributes of a true professional. Maintaining contact with professional organizations is vital to professional
development, as is being a reflective practitioner. Therefore, students are periodically evaluated on their professional dispositions, encouraged to join professional organizations inside and outside of the university, and expected to consistently reflect on their beliefs and actions.

This framework, informed by both experience and scholarship is what drives Lock Haven University’s Secondary Mathematics Education program. The Department of Mathematics strives to embody this framework and to encourage reflection on it by its students, faculty, supporting faculty, and field experience cooperating teachers. We believe that this Conceptual Framework provides a strong basis for developing outstanding secondary mathematics teachers.

References


