# MATH (MATX)

**MATX 333 Mathematical Theory of Interest 3 credits**
Actuaries focus on using math and statistics to evaluate risk and make strategic decisions. This course covers a range of topics relevant to actuaries, including measurement of interest rates, interest theory, and the pricing of bonds, mortgages, annuities, and other financial instruments. This course will also fully cover all content required by the Society of Actuaries Financial Mathematics (FM) Exam and its equivalents. This online course has optional live sessions. (Prerequisite: C- or higher in MAT145)

**MATX 383 Probability for Actuaries 3 credits**
Actuaries and quantitative professionals deal primarily in probabilities. This course will cover a wide range of topics and introduce you to core probability concepts needed for Actuarial and Quantitative work. By the end of this course, you will learn all of the content required for the Society of Actuaries P Exam - as well as its equivalents - and be able to apply concepts of probability to real-world scenarios. This online course has optional live sessions. (Prerequisite: C- or higher in MAT255)

**MATX 483 Actuarial Science and Risk Management with R 3 credits**
This course focuses on team-based problem solving in actuarial science & risk management. Students will learn the fundamentals of the R programming language, RStudio and R Markdown, and use these tools to complete a range of projects. Projects vary, but may include bond and loan amortization, analysis of the efficient frontier and the capital asset pricing method, insurance liability & estimates of expected loss. This course culminates in a capstone project that ties together skills from throughout the Actuarial Sciences program. (Prerequisites: C- or higher in MAT135, CSC115, and MATX383)

**MATX 500 Adding Relevance to Teaching Mathematics 3 credits**
When students engage in mathematics that is relevant to their world, they pose questions, seek answers, and are passionate about math. Relevant and rigorous math satisfies students' natural curiosity while building their understanding of math concepts. When coupled with asking good questions, engaging in three-act math tasks, and incorporating technology, relevant math can also enhance literacy skills, interest in math, and engagement in authentic learning experiences that connect to problem-solving in the real world. In this course, you will learn practical methods for using relevant math concepts, theory, and practice to spur students' excitement for and engagement with math tasks. By examining current research and practice, you will be able to develop lessons that students will both love and remember. For example, you'll develop strategies for integrating inquiry-based learning, authentic problem-solving, math-based investigations, and student-centered approaches to help students tackle complex and rigorous questions. By the end of the course, you will be able to integrate researched-based techniques to guide mathematical inquiry in a manner that motivates and excites students, supports math comprehension, and creates a lifelong interest in math. This course is offered through Advancement Course.

**MATX 504 Fundamentals of Teaching Mathematics 3 credits**
Although math equations never change, there is no end to the tools and techniques you can use to teach them. In this course, you will learn a variety of methods for introducing students to mathematical reasoning, sets and functions, and whole numbers. You'll develop strategies for mathematical instruction on a variety of topics, including number theory, integers, rational numbers, geometry, algebra, statistics, and probability. In addition, you'll create a mathematics-based project that relates to the real world, helping students to see the importance and authenticity of the work they're doing. The strategies you learn in this course will prepare you to teach a variety of mathematical topics in a memorable and engaging way for your students. This course is offered through Advancement Courses.

**MATX 505 Math Manipulatives for Geometry 3 credits**
Whether students realize it or not, geometry is all around them. Whether it's through architecture, interior design, engineering, urban planning, or even fashion design, geometry touches many parts of students' lives and possible future careers, and the spatial reasoning that undergirds this subject is essential for students' academic success. When used correctly, manipulatives are excellent tools to help make geometric concepts more tangible for students without ever having to leave your classroom. In this course, you will learn a number of techniques for using manipulatives to teach geometric concepts to students of all grade levels. You'll explore a wide variety of physical and virtual manipulatives to determine which ones will be most beneficial for your students and your lesson plans. In addition, you'll develop strategies to connect the study of geometry to other disciplines such as language arts, project-based learning, and other creative endeavors. Using the tools and techniques from this course, you will be able to instill vital geometric principles in your students that will not only help them succeed academically, but give them spatial reasoning and problem-solving skills they can use throughout their lives. This course is offered through Advancement Courses.

**MATX 506 Problem Solving in Mathematics 3 credits**
The ability to solve problems creatively and flexibly is becoming increasingly essential in today's world, our careers, and our daily lives. Mathematics is an excellent vehicle for learning these skills, and problem solving is a wonderful way to develop conceptual understanding and procedural fluency in mathematics. In this course, you will examine the research and reasoning behind the movement to emphasize problem solving as a foundation of mathematics education. You will learn how students solve problems and develop strategies for incorporating problem solving in the classroom, both as a goal and as a means for mathematical discovery. You'll also cultivate resources for finding and creating authentic problems for students to solve both individually and collaboratively, and methods for assessing their work in a helpful, meaningful way. With the techniques you learn in this course, you will be able to expand your students' thought processes in a way that helps them in math class and beyond. This course is offered through Advancement Courses.

**MATX 507 Real-World Applications for Algebra 3 credits**
"When will I ever use this?" That's the common complaint from students when they first face the rigors of higher mathematics, starting with algebra. Unfortunately, many teachers' response is to give them an off-the-cuff answer (that they'll forget five minutes later) and then go back to talking about equations. However, you can teach algebra in a way that helps students see its connections to their lives and future careers. By creating authentic assessments that relate to real-life problems, you can increase your students' engagement and motivation in learning the basic principles of algebra. In this course, you will learn to adapt traditional algebra lessons to incorporate modeling and project-based learning. You will examine how students develop problem-solving skills so you can design lessons to aid in that process. Finally, you will create an authentic algebra-based project that you can start using in your class immediately to help your students see the connections between what they're learning and what's beyond the classroom. This course is offered through Advancement Courses.

**MATX 508 Fostering Mathematical Mindsets 3 credits**
Mathematics is not the regurgitation of the facts and algorithms that have traumatized children for generations. Science has proven that we aren't born with or without an elusive math gene that opens doors to successful and rewarding careers. Rather, math is an expression of the patterns that we recognize in our universe, allowing us to make sense of and communicate the wonder of our existence. Building upon Carol Dweck's landmark mindset theory, Stanford University's Jo Boaler has embarked upon a mission to make math accessible to all, and this course gives you the tools to join her mission. You'll examine current research on how our brains process learning in general and math in particular. In addition, you'll develop strategies to encourage students to develop authentic number sense and generate enthusiasm in students while diminishing math anxiety. You'll also learn best practices for providing equitable access to all of your students. With the strategies that you learn in this course, you will be able to create a learning environment that encourages all students to access their natural mathematical abilities and build upon their ability to recognize the math that exists all around them. This course is offered through Advancement Courses.

**MATX 509 Strategies for Developing an Engaging and Effective Secondary Math Curriculum 3 credits**
You've no doubt experienced it: the blank stares, the frustrated expressions, the complaints that students will never use math concepts in "the real world." However, you know that mathematical thinking and principles are essential for students' future; you just need to help them see it. In this course, you will develop a plan for a strong mathematics curriculum that emphasizes a deep and thorough understanding of concepts and skills. You will cultivate strategies and tools to strengthen and deepen math instruction by integrating hands-on activities that highlight critical thinking skills. In addition, you will learn techniques for differentiating and scaffolding your instruction to ensure that you reach students with a variety of learning styles and proficiency levels. After completing the course, you will be prepared to provide your students with an in-depth math curriculum that features real-world activities and best-practice teaching strategies. This course is offered through Advancement Courses.

**MATX 510 Supporting Literacy Skills in the Elementary Math Classroom 3 credits**
Teaching mathematics in the elementary classroom (grades K–5) is markedly different today than it was in the past. New expectations for students and new understandings about how they learn have necessitated changes in instructional practices. Today, we know that math must be developmentally appropriate and accessible for young students, and the process of learning math content must also hone their literacy, problem-solving, and critical thinking skills. In this course, you'll explore strategies for integrating literacy into your math instruction to support the meaningful engagement of your students, including early readers and nonreaders. You'll learn techniques for adjusting your math curriculum and instruction to accommodate different ability levels, focusing on how to develop your students' math and literacy skills as you work with those who struggle with math-related anxiety, learning disabilities, or a lack of challenging content. You'll also acquire tools for promoting collaborative problem-solving among your students. In addition, you'll cultivate resources you can use across your curriculum to make mathematical concepts tangible to your students. Using the resources and techniques from this course, you'll be able to design and implement math instruction that develops your students' math and literacy skills regardless of their learning needs. NOTE: If you have taken the Advancement Courses online course, Math Literacy for Successful Classrooms, we advise you not to take this course, as its contents are similar. You may, instead, take one of our other courses in Math. This course is offered through Advancement Courses.

**MATX 511 Supporting Student Success in STEM Using Blended Learning 3 credits**
The question of whether technology will replace teachers in the classroom is one that often arises in digital learning conversations. While we can agree that computers will not replace our educators, research shows that technology can aid teachers in achieving their instructional goals. In this course, you will learn how to use blended learning–instruction that combines online and onsite (in-classroom) resources and practices–to build a collaborative, engaging, efficient, and effective learning environment that hones students' interest in STEM subjects, and cultivates the skills they need to tackle the challenges of the 21st century. NOTE: If you have taken the Advancement Courses online course, Blended Learning: Teaching in the Digital Age, we advise you not to take this course, as its contents are similar. You may, instead, take one of our other technology courses. This course is offered through Advancement Courses.

**MATX 512 Teaching Math With Children's Literature 3 credits**
Imagine a group of students gathered around their teacher as she reads a beautifully illustrated picture book. She pauses to ask questions about the story, inviting students to share their thinking with the group. After the read-aloud, the students talk excitedly about the book and then play a game based on the story. The teacher is relaxed and animated, and the students love the playful activity. Now imagine this is a math lesson! In this course, you will explore the many reasons why it's beneficial to incorporate children's literature into elementary and middle school mathematics instruction. You will be equipped with several examples of picture books, children's literature, lessons, activities, projects, and games that creatively extend read-alouds into open-ended opportunities to develop students' mathematical thinking. In addition, you will learn how to develop combined math–literature learning experiences that are accessible to many types of learners, foster critical thinking, facilitate collaboration and math-based discussions, and generally encourage students and teachers to have FUN with math! Say goodbye to math lessons that only focus on numbers, solutions, and computation, and say hello to bringing the best of children's literature into math teaching and learning! This course is offered through Advancement Courses.

**MATX 513 Tech Tools for the Math Classroom 3 credits**
In the past, math teachers spent a lot of time telling their students not to use calculators or other technology so they could learn how to work formulas for themselves. However, when used correctly, technology resources can actually be helpful for increasing student engagement, introducing 21st-century skills in the classroom, teaching complex mathematical concepts, and remediating struggling students. But how do you find the right technology tools, and how do you incorporate them in your existing lesson plans? In this course, you will review a wide variety of resources and select ones that will work best in your classroom and teaching context. Regardless of what grade or subject you teach, you'll learn strategies for using technology to engage, inspire, and educate your students. In addition, you'll examine important issues such as learning styles, authentic understanding, differentiation, and assessment so you can better reach all students in your class, including gifted learners and students who have special needs. Using the resources and technique from this course, you will be equipped to enhance your teaching practices and provide your students with a plethora of opportunities to explore mathematical concepts through technology. This course is offered through Advancement Courses.

**MATX 517 The Language of Math 3 credits**
Unlike other subjects, math uses unfamiliar language and symbols that can sometimes intimidate students before they even start to work an equation. As with any technical language, mastering the terminology is essential to the conceptual understanding of the subject matter, but where do you start so as not to overwhelm your students? In this course, you will examine mathematical definitions, the complexity and potential ambiguities of terms, and how to define mathematical symbols as a part of students' vocabulary. You will look at the grammatical structure of mathematical language, and how applying that structure can assist in conceptual understanding. Visual representations and technology can be a great tool for helping students master math terminology. In addition to learning how to incorporate visuals, you will develop road maps for helping students approach word problems, and create rich problem-solving tasks to help build students' conceptual understanding. With the techniques you learn in this course, you be better equipped to prepare your students to navigate the language of mathematics in your classroom and beyond. This course is offered through Advancement Courses.

**MATX 519 Teaching Life Skills and Financial Literacy 3 credits**
In a recent study from the Ewing Marion Kauffman Foundation, 75% of adults said they believed a high school degree should focus primarily not on preparing students for higher education, but on preparing them for the "real world." This finding begs the question: Should high school teachers sacrifice time teaching academic topics to teach life skills? Many believe the answer is yes—and the good news is you can incorporate life skills training into your existing curriculum and classroom practices. In this course, you will examine your internalized beliefs about teaching students life skills in the classroom and explore how you can integrate these skills into your existing curriculum in relevant, motivating ways. You'll develop strategies and tools for engaging parents and community resources and for promoting life skills lessons throughout your school community. In addition, you'll analyze the types of career, financial, and household skills students will need and create standards-based lessons to support your students' development of these skills. With the techniques you gain in this course, you will be able to help your students develop the skills they need to successfully transition to adulthood no matter what educational or career track they take.

**MATX 520 Social Justice in the Math Classroom 1 credit**
Often, we think of social justice topics as belonging most naturally in an ELA or social studies classroom. After all, don't numbers and math formulas work the same regardless of your background or circumstances? However, when done correctly, discussions about social justice issues can actually contribute to a more authentic and relevant learning experience in mathematics. In this course, you'll learn how to implement social justice in the math classroom, with concrete strategies and activities spanning from early childhood to high school. You'll examine how implicit bias has impacted education, particularly mathematics. In addition, you'll see how to incorporate real-world topics in social justice into your math lessons, as well as introducing students to diverse trailblazers in the field. Using the strategies from this course, you'll be able to create a more academically, culturally, and socially sound environment for teaching and learning mathematics.

**MATX 521 Using Diagnostic Assessments to Differentiate Math Instruction 2 credits**
Math teachers face enormous pressure to help their students perform well on state and national exams. However, these cumulative end-of-year assessments do little to help teachers evaluate how students are performing throughout the year and how to help them effectively while they're still in your classroom. That's where diagnostic assessments come in. Diagnostic assessments give you the data you need to determine students' needs and drive instructional practices to improve their learning. In this course, you will learn a variety of assessment techniques to help you diagnose students' strengths and weaknesses in the math classroom. The key to differentiating curriculum is having the appropriate data that show you what kind of support students need. Therefore, we'll explore how to create assessments that yield the right data, plus techniques for implementing the assessments successfully. In addition, you'll receive tech tools, posters, graphic organizers, and templates that will help you design assessments and differentiate your curriculum. Using the techniques from this course, you'll be able to meet the diverse needs of all learners in your classroom to help them achieve their highest potential in math.

**MATX 522 Unconventional Math Strategies for the Elementary Classroom 2 credits**

Math really is all around us! Math can be fun, imaginative, and extraordinary, and can challenge the ways we think about life. Unfortunately, traditional education methods of drill-and-kill and rote memorization often stifle learning, curtail motivation, and contribute to students' math anxiety. In this course, you'll learn how to excite and inspire your students about math using creative instructional strategies that align with how students actually learn. You'll see how you can play with math naturally through games, culture, and community to build students' intuitive and conceptual understanding. You'll also develop key strategies for designing quality lessons, finding great resources, using questioning techniques, and developing assessments that will ignite critical thinking, persistence in problem-solving, and a growth mindset. Above all, you will inspire a love of mathematics and support students using developmentally appropriate, engaging, and transformative pedagogy. With the tools and techniques from this course, you'll be able to dispel your students' anxiety and foster deep learning, excitement, and passion for mathematics. This course is offered through Advancement Courses.