

SCIENCE (SCIX)

SCIX 501 Crafting Engaging Elementary Science Instruction with Stories 3 credits

When students engage in scientific inquiry, they pose questions and seek answers about the world around them. Scientific inquiry satisfies students' natural curiosity while building their understanding of science concepts. When coupled with captivating picture books and stories, it can also enhance literacy skills, interest in science, 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 children's literature, reinforced with hands-on, inquiry-based investigations, to build scientific literacy. You will gather resources that you can use to engage students in lessons they will both love and remember. You'll be able to integrate science and reading, using children's literature to guide inquiry in a manner that motivates and excites students, supports science comprehension, and creates a lifelong interest in science. Using the strategies and resources from this course, you'll be able to grow both your students' reading comprehension and their ability to pursue scientific inquiry through engaging, student-centered lessons that you will all enjoy. This course is offered through Advancement Courses.

SCIX 507 Nature Education and Environmental Literacy 3 credits

Children today are increasingly indoors, overscheduled, and tied to technology, and many schools have had to cut back on nature education programs in favor of instruction tied to standardized tests. Consequently, fewer students are pursuing careers in environmental science and conservation. However, research has found that when nature education is supported by well-informed, engaged teachers, children develop an "environmental literacy" that greatly benefits them emotionally, creatively, cognitively, and academically. In this course, you will develop practical, actionable strategies to connect students with the natural world. You'll learn the importance and benefits of nature education and explore techniques for teaching environmental literacy to enhance student engagement and performance across disciplines. In addition, you'll create hands-on, creative activities that will nurture students' reflection and observation skills as well as their naturalist intelligence (one of Howard Gardner's multiple intelligences). Using the methods from this course, you will be equipped to instill in your students an appreciation and love of nature that will have a lasting positive impact in their lives. This course is offered through Advancement Courses.

SCIX 508 Next Generation Science Standards: A New Framework for Authentic Science Instruction 3 credits

The Next Generation Science Standards (NGSS) are a new set of science educational standards that address needs in K–12 science education, based on A Framework for K–12 Science Education (National Research Council, 2012). The NGSSs are aimed at improving science learning and engagement in the 21st century by (a) incorporating authentic science and engineering practices, (b) identifying crosscutting concepts that are fundamental to connecting knowledge across science and engineering, and (c) establishing disciplinary core ideas that support students' acquisition of new knowledge. In this course, you will take an in-depth look at the framework, including the learning progressions that track how science learning occurs at increasingly sophisticated levels as students get older. You will learn practical strategies for translating the NGSS to classroom practices that engage students in authentic learning, and inspire all students to succeed in science. By the end of the course, you will be able to make the shift to planning and teaching using the NGSS to improve student success in science. This course is offered through Advancement Courses.

SCIX 510 Teaching Environmental Science 3 credits

Environmental science is a hot topic on the national and international stage. Because of the political, economic, and ethical concerns surrounding the subject, teaching environmental science is no longer a simple matter of examining environmental processes. Rather, it is a complex interweaving of current events, the study of ecosystems, and the application of the scientific method. In this course, you will develop tools and strategies for teaching current environmental thought; physical, chemical, and biological principles related to environmental science; environmental economics and ethics; and current environmental problems. Using Vygotsky's Theory of Instruction and Development, you will examine how to nurture active learning and help students become critical consumers of information in the field of environmental science. By teaching students to interpret data using the scientific method, you'll foster their development of evidence-based reasoning skills and prepare them to sort through misconceptions and new concepts in the field. Using the methods from this course, you'll be able to produce students who are critical, unbiased scientific thinkers who can engage with environmental issues with a global view in mind. This course is offered through Advancement Courses.

SCIX 511 Teaching Science to Elementary Students 3 credits

According to the National Science Teachers Association (NSTA), learning science is vital for helping students "develop problem-solving skills that empower them to participate in an increasingly scientific and technological world." It is our job as educators to provide students with highly engaging, rigorous, and authentic learning experiences that help them to develop these crucial skills. In this course, you will explore resources and techniques for teaching science to elementary students in accordance with the Next Generation Science Standards (NGSS). You'll develop strategies for creating high-quality, captivating, and challenging science lessons for elementary students, including hands-on learning experiences, inquiry-based learning, and research assignments. In addition, you'll cultivate techniques for creating a classroom environment conducive to learning science and differentiating your instruction to meet your students' various learning needs and styles. Finally, you will learn how to plan cross-curricular lessons and units that integrate science into literacy instruction. With the knowledge and skills from this course, you will be equipped to teach science to elementary students in a way that engages and sticks with them far beyond your classroom. This course is offered through Advancement Courses.

SCIX 512 Teaching Scientific Argumentation and Critical Thinking 3 credits

Both the Common Core and Next Generation Science Standards emphasize the importance of argumentation in science education. That's because argumentation requires students to generate and justify claims based on evidence, which leads to deeper understanding and more critical consumption of information. Using case studies and argumentation to engage students in thoughtful reasoning and debate is an effective way to teach not only academic content, but also process skills and critical thinking—all while allowing students to make connections between the classroom and everyday life. In this course, you'll learn how to use case studies to engage students in science content while improving their critical-thinking skills. You'll review numerous examples of case studies that address a variety of science learning objectives and choose ones that you can integrate into your own instruction. In addition, you'll cultivate several strategies for scaffolding argumentation in the classroom and developing questioning techniques that will motivate students and enhance learning. Finally, you'll gain tools for evaluating student work using this educational framework. By the end of the course, you will be able to incorporate case studies and argumentation into science instruction in a way that teaches critical thinking and deepens scientific understanding. This course is offered through Advancement Courses.

SCIX 513 Teaching Tough Topics in Biology 3 credits

Many students struggle to learn core concepts in biology, including proteins and genes, cellular respiration, and ecosystem stability. Because new discoveries are being made all the time, biology teachers have to constantly familiarize themselves with new concepts and figure out how to effectively teach these ideas to their students. In addition, many states are adopting the Next Generation Science Standards (NGSS), which are aimed at improving science learning and engagement in the 21st century. These new standards offer an opportunity to improve science instruction, but with that opportunity comes the challenge of planning and implementing NGSS-aligned lessons. In this course, you will learn practical, research-based methods for teaching biology concepts that traditionally have been hard to teach. You will engage in an instructional framework that you can use to plan and implement effective biology units, and learn how to select instructional strategies that support student understanding of fundamental biology concepts. With the techniques and strategies you learn in this course, you will be able to confidently teach your students about the ever-evolving field of biology while adhering to cutting-edge educational standards. This course is offered through Advancement Courses.

SCIX 515 Climate Change: Engaging Students in a Global Conversation 3 credits

According to a recent statement from the United Nations, climate change is the defining issue of our time. With catastrophic flooding, droughts threatening our food supply, and temperatures on the rise, change is happening quickly, and the prospect of talking to students about it can feel daunting. Many teachers do not understand climate change well themselves, and those who do sometimes fear that teaching students about climate change may cause them anxiety and stress. In this course, you will learn strategies for teaching students about climate change in a way that is hopeful and inspiring. When students have a well-rounded picture of climate change, they will be empowered to discuss possible solutions, ideas for future mitigation, and personal accountability. Integrating science and solutions equips students to move forward as leaders of the next generation who can address climate change in a positive and productive manner. By the end of this course, you will be able to integrate hopeful and positive lessons on climate change into your curriculum to prepare your students for one of the most pressing challenges of our time.

SCIX 516 Fostering Active Learning in Chemistry 3 credits

Many students struggle to learn core concepts in chemistry, and teaching chemistry can be equally challenging at times. New discoveries are being made all the time, and chemistry teachers have to constantly familiarize themselves with new concepts and figure out how to effectively teach them to students. That's why the American Chemical Society created guidelines and recommendations for teaching the four big ideas that all high school chemistry classes should explore. In this course, you will learn how to implement the 5E model of science instruction to introduce students to the big ideas in chemistry that have traditionally been hard to teach. Using the 5E model will help you create lesson plans that are inquiry-based and engaging for students. With the 5E model in place, you can build hands-on activities to help your students reach beyond memorizing content and start thinking critically and scientifically. You will also learn how to make sure that your teaching aligns with NGSS standards for chemistry. Using the strategies from this course, you will be able to confidently teach your students about the ever-evolving field of chemistry with a focus on the American Chemical Society's four big ideas that all students should know.

SCIX 517 Inquiry-Based Learning in the Science Classroom 3 credits

In this course, you will explore the many benefits of IBL as well as how to connect IBL lessons to standards such as NGSS, STEL, and CCSS. Using a backward design process for building units, you'll learn how to (1) structure your classroom routines and practices to support student driven investigations and (2) create highly engaging and interactive assessments that will work for both remote and in-person learning. Throughout the course, you will also develop culturally responsive teaching practices to encourage students with different learning needs and from diverse backgrounds to embrace a passion and talent for science and engineering.