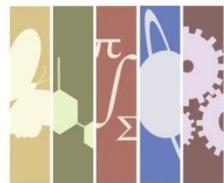




COURSE CATALOG



CIRTL Network
Center for the Integration of
Research, Teaching, and Learning



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Introduction

The Delta Program in Research, Teaching, and Learning offers a variety of courses and programs during the fall, spring, and summer semesters. All courses are open to graduate students and postdoctoral researchers, with several programs offered exclusively for current faculty and staff members. Delta courses are held on campus and some can be taken for graduate-level credit. Students are also invited to enroll in the online courses offered by the Center for the Integration of Research, Teaching, and Learning (CIRTL), a network in which UW–Madison and the Delta Program are founding members.

This catalog presents descriptions of the Delta Program’s standard courses and programs. Courses offered by Delta partners at UW–Madison (e.g., WISCIENCE) that apply toward the Delta Certificate Program, as well as the CIRTL Network online courses, are also included. All information is subject to change. The most current information can be found on the Delta Program website (www.delta.wisc.edu).

Delta Core Courses and Seminars

Each semester the Delta Program offers a variety of core courses. Several courses can be taken for graduate-level credit through the University of Wisconsin-Madison. For more information about each offering, please visit the Delta website.

Teaching in Science and Engineering: The College Classroom

In this course, you will gain knowledge on the basics of learning theory and effective teaching methods so you can operate at the forefront of ideas in college education. You will explore your teaching philosophy and how it will impact your future classes, design a course curriculum, engage in micro-teaching, and learn how to monitor and investigate the effectiveness of a learning environment.

Teaching in Science and Engineering: The College Classroom International

Do you wish to become an effective math, engineering, or science instructor, with a deep understanding of how to use international diversity as an asset rather than a liability in your classroom? If so, this course is for you whether you are a US-born or international graduate student or post-doc. In this course, you will learn the core skills of effective and savvy teachers who can use global perspectives, varied modes of instruction, and differences in students' expectations as tools to increase the learning of every student in their classes.

This course focuses on the challenges posed by teaching an increasingly diverse student population. Although the course places an emphasis on international instructors and international students, it is not as much about studying cultural, racial and social views as it is about learning how to take advantage of the unique perspectives of each student in our classes to engage them fully in the course content. Participants will gain knowledge and hands-on practical skills in creating college courses designed as effective learning environments for their students. This is a discussion-based course modeled after "flip-classroom" and "blended learning." For more information, visit: <https://dairynutrient.wisc.edu/isif/>.

Diversity in the College Classroom

In this course, you will take a critical and practical look at how you define "diversity" and for what purposes. We will also discuss the ways different definitions of diversity might influence what is included in a course's content and how the course is taught. Discussions focus on the diverse participant experiences and the ways of knowing that have the potential of enriching every classroom and laboratory. In the second half of the course, you will apply what you have learned in developing a diversity-related project.

Effective Teaching with Technology

Effective Teaching with Technology will help you develop new approaches to the effective use of instructional technology in your teaching practice. You will learn how technological choices can affect the learning of today's diverse student populations. In addition to several mini projects, you will complete a Teaching-as-Research project to study how technology can affect student learning in your discipline. This course is designed for graduate students and postdocs who desire to explore the potential of new instructional tools and methods to improve their teaching practice. The goals of the class are to 1) provide foundational knowledge for choosing appropriate technological tools for specific learning situations, 2) provide active learning experiences through class sessions and independent projects in the effective use of learning technologies including interactive web applications, multimedia enhanced lectures, social media and course management tools, and 3) promote the importance and scholarship of the evaluation of instructional technology efficacy.

Instructional Materials Development

Students in this project-based course work together as teams of faculty, staff, graduate students, and postdocs to design materials for an existing undergraduate class. The existing course will provide context and focus for the new materials, and then the teams work to identify an important learning objective that is posing a problem for students, develop a hypothesis about the source of the problem, and design an assessment plan. Past participants have developed course modules, labs, active-learning activities, and assessments. This course focuses on specific topics which vary each semester; past semesters have included:

- Flipping the classroom
- Integrating Statistics into STEM Courses

Research Mentor Training Seminar (graduate student and postdoc section)

Offered in collaboration between WISCIENCE and Delta, the Research Mentor Training Seminar is designed to help graduate students and postdocs become effective research mentors. Seminar discussions focus on different mentoring styles and strategies for developing confidence, independence, creativity, and communication skills in your current and future mentees. The mentor-training seminar consists of weekly one-hour sessions in which participants address issues in mentoring through facilitated discussions based on collaboration and collective problem solving. Participants will read articles and case studies, write biographies of their mentees, compare their goals with those of their mentees, explore time-management strategies, and write mentoring philosophies. This is a terrific opportunity for new mentors to get off on the right foot, and for experienced mentors to share their wisdom.



Internship Seminar

The Delta Internship Program gives graduate students and postdoctoral researchers the opportunity to develop teaching and learning skills in real-world situations. Each semester, the Delta Program supports a new cohort of interns who partner with faculty and staff to improve teaching and learning environments through innovative Teaching-As-Research projects. Interns enroll in this seminar during the semester in which they are implementing their internship project, and use the time to present their projects to their peers who provide constructive feedback in real-time. Enrollment is limited to only those students who have applied for and been admitted into the internship program. Visit the [Delta Internship Program Web site](#) for more information.

Informal Education: A Practicum for Scientists

Make no mistake about it—one of the most important skills you need to develop during your graduate school career is the ability to communicate your work to a wide array of audiences. That facility enables you to speak effectively about your research with your peers and then walk into an undergraduate classroom to tell a group of 19-year-old students about the same exciting subjects. In this course, you will become familiar with the concepts and processes important to communicate science successfully to a variety of audiences who might have scant knowledge of science, may not be interested in science, or may be diverse in backgrounds and interests. You will learn 1) the importance of understanding your audience, 2) how to better explain science to others, 3) the design, production, and evaluation of an informal education product, and 4) the breadth of informal science venues and modalities available to the general public.

Improv to Improve Teaching and Communication (short course)

Using storytelling and character-development techniques of theatrical improvisation, participants build confidence, teamwork, leadership, listening and decision-making skills through the performance of short games and scenes. Participants will be able to better think on their feet, manage constructivist classroom, and communicate science more effectively to both technical and non-technical audiences. Each session will be comprehensive, diverse, and dynamic (in addition to being a lot of fun), and will build on the skills from the week before. Due to the sequential nature of the class and the necessity of building a supportive learning community, please defer taking the course if you know in advance that your schedule will require you to miss more than two classes.

Expeditions in Learning (Topics Vary)

Expeditions in Learning is founded on collaborative and experiential learning. The program is designed to take advantage of campus learning opportunities that are new or unique to many, and provide "programmatically permission" and supportive colleagues for you to go places you

have never gone before as you explore campus, observe diverse classroom settings, and engage ideas in a new way. Several expeditions (or mini-field trips) are sprinkled throughout the semester supplemented by small-group discussions. The discussions are intended to connect your expeditions to your teaching, to learn from others about their diverse experiences, and to broaden our understandings about each other. Previous topics have included:

- Writing Across the Curriculum
- The First-Year Experience
- The Pedagogy, Principles and Best Practices of Academically Based Service-Learning
- Putting the OUT in Outreach
- Classroom Observations
- Academic Institutions
- Learning to Lecture (for faculty)
- The Power of High-Impact Teaching and Learning Practices in STEM

Informal Education: Engage Children in Science

UW–Madison undergraduate and graduate students in the sciences have interest, enthusiasm and expertise in many diverse areas of science, from biology to engineering. Many of them have a sincere interest in sharing their enthusiasm and knowledge with younger students but do not have the tools to do so. Though they have adequate scientific background, they need to learn about the learning process, the needs and learning styles of children, techniques for engaging young people in the process of science, means of evaluating informal learning experiences, and techniques for reflecting on their own learning from community service experiences. This course provides them content information, hands-on experiences, and opportunities for dialogue and reflective experiences directly connected to their experience in leading an after-school science club. The course is part of the *Adult Role Models in Science* (ARMS) program, a partnership program with the goal of enhancing science education in elementary and middle schools. This course is offered through WISCIENCE. The course requires a one-year commitment and is a 2 semester sequence.

Delta Occasional Courses and Seminars

In addition to its core courses, the Delta Program partners with other institutions and departments on campus to offer intermittent courses related to teaching and learning. Examples of previous courses are listed below.

Diversity in the College Classroom: Bridging the Achievement Gap

The Delta Program's *Bridging the Achievement/Equity Gap Project* takes an action-oriented research approach to addressing the University of Wisconsin's achievement gap that separates underrepresented minority students from their peers, particularly in courses that serve as gateways to various majors. The project asks how faculty, staff, graduate students, and other institutional actors can more equitably serve underrepresented minority students and create inclusive classroom environments. This special section of the Delta Program's Diversity in the College Classroom course is the first step to participating in the Bridging the Achievement Gap Project. In class, graduate students and postdocs learn about and discuss topics related to diversity and the achievement gap. Later in the semester, they work with faculty and staff participating in the Delta course *Creating a Collaborative Learning Environment* to develop action plans to narrow the academic achievement gap in their respective courses. Students are encouraged to then complete the second step of the project in the fall semester, as students enroll in the *Delta Internship Program* and work with instructors to implement and evaluate their action plans. Students complete two requirements toward the *Delta Certificate in Research, Teaching, and Learning* during their participation year.

Scientific Teaching

This course is designed for graduate students who will be serving as teaching assistants for the first or second time in a biology-related course. It will arm you with survival skills for teaching and knowledge about learning. You will be asked to answer questions such as how does learning work, who are my students and how can I better engage them, how can I give my students feedback that fosters learning, is it possible to balance teaching and research, what are "essential learning outcomes" and "high-impact practices" and how can I incorporate them into my teaching, and what role does social media play in learning? This course is offered through WISCIENCE and must be taken for one credit.

Teaching Sociology

This seminar focuses on best-practices in teaching sociology in a college/university setting, primarily to undergraduate students. During the course, participants will systematically discuss the major components of a course, including course goals, topic outline, use of readings, use of class time, evaluation of students, and evaluation of yourself as an instructor. The seminar is designed to benefit those with and without teaching experience. Those without experience will become sensitized to the many components of effective teaching and receive guidance in the

process of preparing a course. Veteran instructors will be encouraged to think more systematically about their teaching and consider alternative forms of instruction.

Teaching Transitioning Students

A “transitioning college student” is one who is either arriving as a new freshman or transferring from another institution. In this class, you will explore the body of literature surrounding best practices for teaching transitioning college students. The course is designed for individuals who intend to serve as faculty or instructors in a college setting or those who plan to work in a college or university context. Participants will be asked to complete a reflection activity prior to the first class session, which will be utilized as a conversation starter. Throughout the semester, you will read a number of short articles and book chapters that relate directly to class discussions. Participants will have opportunities to practice the teaching methods examined throughout the course, and a final project will yield a course syllabus and lesson plan that implements the strategies discussed throughout the semester.

Research and Evaluation in Science Outreach and Informal Science Education

This course offers a skills-focused (but theoretically grounded) introduction to studying and evaluating science outreach projects. By focusing on concrete examples from UW-Madison’s vibrant outreach community (and the city of Madison’s informal science education institutions), students will learn to (1) distinguish between research and evaluation, as well as the different types of evaluation and the purposes they serve; (2) understand the social context of science outreach and address equity/diversity/access concerns in research and evaluation; (3) develop and apply research and evaluation tools that match a project’s goals and stage of development. As their final project, students will work in teams to develop conceptually solid and pragmatic evaluation plans for real outreach projects (either projects they are involved with themselves or projects that volunteer to act as course examples). Firmly rooted in education scholarship, this course will complement existing offerings in Curriculum & Instruction as well as the CIRTL and Delta programs that serve science and engineering graduate students across campus.

Teaching Statistics in the Classroom

This seminar is aimed at graduate students in statistics, as well as statistically oriented students in other departments. A portion of the seminar will be focused on issues of broad relevance to teaching in the sciences, such as learning styles, Bloom's taxonomy, assessment, and the use of technology in the classroom. The remainder of the semester will focus on topics related to the statistics discipline, including how to teach statistics to a range of audiences, from those with reasonable skills in mathematical reasoning to those with math anxiety. Class time will include discussion of readings, visits from guest experts, and active exercises. Outside of class, participants will complete course readings and some short assignments, as well as participate in a small-group project. Preparation time outside of class is anticipated to be 2–3 hours.

Research Mentor Training Seminar (faculty section)

The success of undergraduate and graduate research experiences depends largely on a positive relationship between the student and the research mentor. Therefore, it is vital that current and future faculty be effective mentors. This seminar, offered in collaboration with WISCIENCE, is designed to help current faculty members become more effective research mentors. Seminar discussions focus on different mentoring styles and strategies for developing confidence, independence, creativity, and communication skills in your mentees. Rather than adding to the time you will spend mentoring, this seminar is designed to improve the efficiency and effectiveness of your mentoring. The mentor training seminar consists of 6-8 weekly one-hour sessions in which you will address issues in mentoring through facilitated discussions based on collaboration and collective problem solving.



Delta Programs

Programs include seminars and discussion groups that support the learning community.

Creating a Collaborative Learning Environment

Creating a Collaborative Learning Environment (CCLE) is an opportunity for a small group of faculty and academic staff members to collaboratively explore how people learn and its implications for your teaching. Since 1993, nearly 300 faculty, staff, postdocs, and graduate students from across campus have participated in CCLE. This program is founded on the belief that to effectively focus on teaching, we must first have a fundamental understanding of the complexities of learning. The program is designed to expand upon the existing literature by using your personal experiences with learning, and to do so in a collaborative setting where all voices can be heard.

Creating a Collaborative Learning Environment: Bridging the Achievement Gap

Bridging the Achievement Gap is a three-year collaborative project at UW–Madison. It is designed to take a systematic, Teaching-as-Research-based approach toward addressing the achievement gap that separates under-represented minority students from their peers, particularly in courses that serve as gateways to various majors. In this special section of Delta's Creating a Collaborative Learning Environment (CCLE) program, faculty members will come together to raise their awareness of core achievement gap issues and move toward appropriate evidence-based action in their classrooms. Opportunities will be presented to work with graduate students who are also engaged with the university's achievement gap project by partnering to design, develop, conduct, and evaluate Teaching-As-Research projects. This experience will introduce or build on existing curricular reform in the courses.

CIRTL Network Core Courses and Seminars

The CIRTL Network Learning Community is an investment in Learning-through-Diversity. CIRTL courses provide an opportunity for UW-Madison future faculty to learn from graduates-through-faculty at diverse universities around the nation. CIRTL courses are offered both online in a web-based virtual meeting room to promote synchronous interactions between participants and asynchronously to promote any-time, any-place connection across the Network. For more information, please visit <http://www.cirtl.net/courses/main>.

The College Classroom

In this CIRTL Network course, students will learn the basics of effective teaching as well as ideas in the forefront of college education. Students will explore their teaching philosophy, design a course curriculum, learn how to monitor and investigate the effectiveness of the learning environment, and explore what it means to create an inclusive classroom environment that engages all learners. An emphasis on a learning-centered classroom will provide students with a perspective that highlights the interconnected cycle of teaching, assessment, and learning such that they become reflective practitioners, viewing their classroom as sites for ongoing research into their own teaching.

Diversity in the College Classroom

Become a better college instructor by considering the complex issues of diversity and how to address them effectively in your classroom practice. We must consider that the way we teach differentially impacts the success of our students. This course is designed for graduate students and postdoctoral researchers who have an interest in advancing diversity issues as educators. Participants will take a critical yet practical look at how we define diversity and for what purposes, and discuss the ways different definitions of diversity influence what and how we teach our disciplinary topics. You will also create a diversity-focused plan of action for your future teaching practice.

Effective Use of Technology in Teaching and Learning

Do you want to explore and develop new approaches to the effective use of instructional technology in your teaching practice? In this class, you will learn how technological choices can affect the learning of today's diverse student population while completing a research project to study how technology can affect student learning. You will also set a foundation for choosing appropriate technological tools based on learning needs, gain hands-on experience with some of today's most innovative technological tools, and evaluate instructional technology efficacy.

Research Mentor Training Seminar

This seminar is designed for graduate students, postdoctoral fellows and faculty across the CIRTL Network who wish to improve their skills in mentoring. In this seminar, you will learn to:

- Improve the efficiency and effectiveness of your mentoring
- Help provide your mentees with a better research experience
- Improve your mentees' research productivity

Through facilitated discussions using a format based on collaboration and collective problem solving, you will learn about different mentoring styles and strategies for developing confidence, independence, creativity, and communication skills in your mentees. You will read articles and case studies, compare your goals with those of your mentees, explore time management strategies, and further develop your mentoring philosophy. Rather than adding to the time you will spend mentoring, this seminar is designed to improve the efficiency and effectiveness of your mentoring.

Teaching-as-Research

Teaching is a scholarly endeavor that, ideally, utilizes research techniques to evaluate teaching practices and student learning. The focus of this class is to teach future and current STEM educators how to conduct education research with the ultimate goal of informing their own teaching. In this course, students will:

- Identify Teaching-as-Research (TAR) practices
- Develop learning objectives and TAR research questions
- Learn how to find and review prior scholarly research on a question of interest
- Discuss different research instruments and strategies
- Use evidence to draw conclusions about teaching strategies and/or student learning
- Discuss ways one can use conclusions to inform both their own teaching and their colleagues in the STEM education community

CIRTL Network Occasional Courses and Seminars

The courses below have similar structure as the CIRTL Core courses but are offered intermittently based on students' and instructors' interests.

Developing a Teaching Portfolio

This course guides participants in developing a Teaching Portfolio for improving teaching and enhancing job search potential. The web-based curriculum introduces essential elements of the portfolio, provides tools for gathering necessary documentation, and through individual feedback from the instructor, assists participants in drafting a personal Philosophy of Teaching, upon which the Portfolio is built.

Inquiry-Based and Problem-Based Learning in the College Classroom

Integrating research and teaching remains one of the grand challenges for STEM education in universities and colleges. We will explore the use of inquiry-based and problem-based learning in the college classroom as one means to integrate research and teaching. Inquiry-based (IBL) and problem-based learning (PBL) is a student-centered pedagogy in which students learn about a subject in the context of complex, ill-structured, and realistic questions or problems. Student work in this class will focus on developing a teaching-as-research project using IBL or PBL as the central theme of the project. The project could be focused on a range of questions such as instructional material design, evaluating IBL or PBL in the classroom, or student misconceptions while engaging in authentic questions or problems.

How Teams Work and How to Work Better in Teams

This course covers topics in leadership, management, decision making, and social science that will help participants understand the dynamics of teams and how process can help ensure better decision making. It is designed especially to help participants who work in multidisciplinary and or multicultural teams.

Teaching and Learning Science—Revealing Student Thinking and Conceptual Obstacles to Learning

This CIRTL Network course explores how undergraduate students understand their disciplines. Participants discuss course design and how it interacts with student thinking, misconceptions and conceptual gaps, which are among the most serious barriers to new learning.

Small-Group Collaborative Learning

This course presents a short introduction to peer-led, small-group collaborative learning. The course uses the Rochester Workshop Program as a case study to explore the roles of learners. The topics include peer leaders and instructor; theories of learning; theories of classroom interaction; writing collaboration-oriented problems; practicalities of implementation.

Teaching Science and Engineering through Debating Civic Issues

One of the main goals of STEM education is to cultivate a scientifically literate citizenry, able to deal intelligently with debates over “hot” issues like biotechnology, alternative energy, and climate change. Activities like structured discussions, mock trials, model public hearings or in general debates also have been shown to be effective at fostering deeper engagement with course content and deeper learning. This one credit (approximately 3 hours per week) online course will invite you: to reflect on the objectives of debate pedagogy; to investigate how it’s being used in your own discipline; to explore measures of success; and to experience debate exercises in both teacher and student roles. You’ll end the course having designed a “teaching-as-research” debate exercise suitable for one of your own courses.

CIRTL Mini Courses

CIRTL Service-Learning: Implementing Service-Learning in STEM Disciplines

This course will provide an introduction to the basics of service-learning pedagogy for graduate students interested in using this teaching approach in a course. Students will explore best practices in service-learning, steps to consider in developing a course using service-learning, strategies for working with community partners, and the research on using service-learning in teaching.

Teacher Training Learning Modules

Teacher Training Learning Modules (TTLM) will enhance the development of STEM instructors and future faculty across the CIRTL network. The series of modules is for all STEM future faculty and we are targeting early graduate students or those graduate students new to teaching, at the CIRTL Fellow or pre-CIRTL Fellow level, although we expect these TTLMs would benefit participants at all levels of their academic career. The TTLMs will cover basic and advanced topics in teacher preparation. Participants will expand their academic flexibility by adding in-depth teacher training on learning communities, discourse and questioning, evidence-based teaching, gender equity and stereotype threat, and teaching as research.

Flipping - “A New Generation for Active Learning”

In its simplest form, flipping reverses lectures and out-of-class elements. The lecture is viewed prior to class, devoting in-class time to truly engaged learning by students. In theory, students become more accountable for their learning and the instructor becomes an active coach in teaching STEM. This CIRTL mini course will explore many aspects of flipping the classroom by actually utilizing a flipped model with participants.

“What the Best College Teachers Do”: A Discussion about College Teaching

This CIRTL mini-course will combine online synchronous discussions about Ken Bain's book, "What the Best College Teachers Do" with asynchronous online activities. Bain interviewed a select group of college faculty and asked them about their teaching practices: how they prepare to teach, how they articulate expectations of their students, how they engage students, and how they evaluate students and themselves. Each chapter touches on these important elements of effective teaching, and we will use the book as a point of departure to discuss these issues in greater detail- especially as they pertain to teaching and learning in STEM.