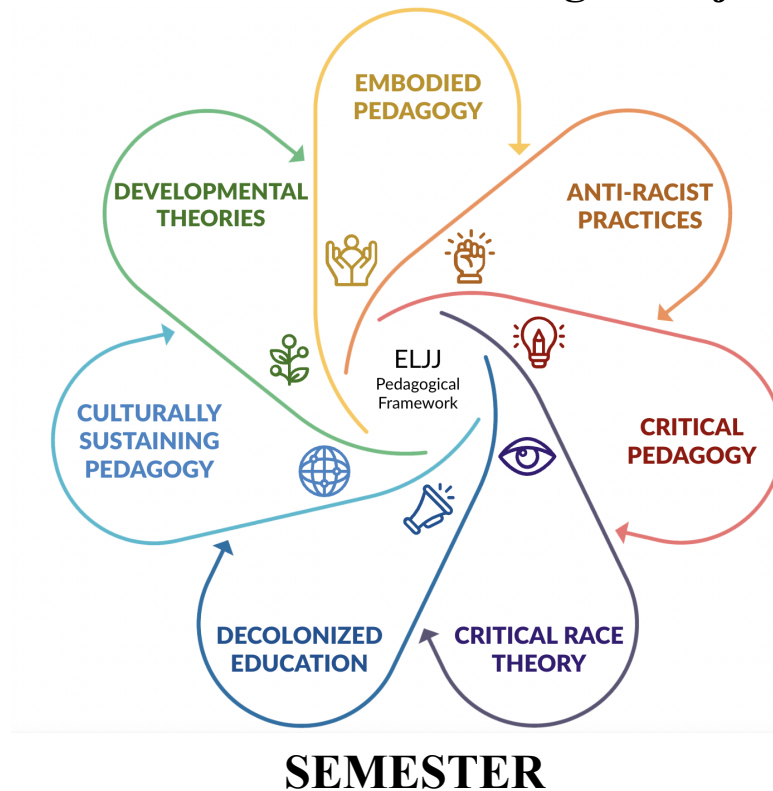


EDUT 6122

Curriculum & Instruction 2 – Single Subjects STEM



Please note this syllabus includes hyperlinks with additional information to some assignments. They will be highlighted and formatted in the same manner.

Credit: 2 Semester Hours

Instructor:
Telephone:
Email:
Office Hours:

Room:
Time:

Course Description

Offers core instructional components for secondary math and science credential candidates. Includes an overview of curriculum and instruction issues for secondary classrooms. Uses structure of knowledge in content areas as a basis for understanding curricular planning as the student teacher considers what and how

to teach and for what reasons. Also includes instructional and classroom management strategies; planning, technology, and assessment for secondary classrooms; and mandated state and local frameworks for secondary subjects. The course will address the following TPEs: 1.3, 1.4, 3.1, 3.2, 4.3, 5.1, 5.2, 7.9.

ELJJ Goals

We aim to prepare teachers who have the disposition and skills necessary to gather empirical evidence needed to examine and evaluate curricula, pedagogies, and assessment for justice, inclusion, transformation, and liberation. We also want to be sure that ELJJ teachers can build on their students' and their own assets to ensure that growth and learning is developmentally appropriate and healing. We expect teacher candidates in our program to identify ideologies and inequities from a critical perspective and work toward dismantling them and foster conditions that are fair and equitable. Finally, we see ourselves as a community who appreciates our shared experiences and vision to change education for the better and enjoys our collaborative work. By the end of this course, the students should be able to demonstrate their achievement toward the goals through a set of Measurable Criteria as listed following each goal:



Goal 1. Safety, Wellbeing, and Care

- a. 1. Value and aim to ensure the safety and wellbeing of every student as well as colleagues in ELJJ (and other programs).
- b. 2. Actively create a space that welcomes, includes, nurtures, and appreciates students of all backgrounds.
- c. 3. Creates and maintains a safe working and community environment for students, colleagues, and self.
- d. 4. Recognize that teaching is inherently moral and guided by an ethic of care.



Goal 2. Culturally-sustaining, anti-racist teaching

- a. Recognize that one's positionality (i.e., gender, race, sexual orientation, socioeconomic background) and life experiences biases our lens in how we one sees others, particularly those who come from vastly different positions.
- b. Demonstrate interest in learning with and from others, especially those from historically marginalized communities and who are not in positions of power.
- c. Purposely seek out the perspectives of those from nondominant backgrounds (i.e., people of color, undocumented, materially privileged, LGBTQAI).
- d. Practice intentional listening, making space for marginalized voices, in classrooms and community settings.
- e. Focus on how (not if) privileged parts of one's identity shape life and teaching practice.

Course Goals

- ★ **STEM Literacy:** Deepen understanding of STEM curriculum and instructional principles, focusing on the nuances of a STEM-literate society and integrating advanced ELD techniques in STEM teaching.
- ★ **Empathetic Design:** Enhance skills in designing STEM lesson plans infused with culturally responsive practices (CRP), a social justice ethos, and specific strategies for English language learners.
- ★ **Literacy Strategies:** Employ methodologies that not only accentuate STEM literacy but also incorporate ELD strategies to enhance language development in STEM subjects.
- ★ **Plan with Purpose:** Implement foundational planning principles with a focus on orchestrating engaging STEM learning episodes that integrate ELD strategies.
- ★ **Positional Self-awareness:** Engage in introspection about one's positionalities, especially in relation to teaching English learners in STEM subjects.
- ★ **Theoretical Grounding:** Develop a theoretical foundation that shapes pragmatic decisions in teaching, including the integration of ELD strategies in STEM education.

Learning Outcomes: Upon successful completion of the course, students will be equipped to:

- ★ **Sociocultural Acumen:** Demonstrate a keen sociohistorical and sociocultural understanding of disparities within U.S. schools and society, and adopt strategies to address these through curriculum and teaching.
- ★ **Classroom Dynamics:** Develop and implement methods to foster a nurturing, rigorous, and supportive classroom environment that centers care and respect.
- ★ **Justice in Pedagogy:** Embrace and apply socially just teaching methodologies that disrupt dominant narratives, reflecting these commitments in their behavior, actions, and curricular choices.
- ★ **Reflective Practices:** Engage in critical self-reflection, assessing personal development and socialization patterns, and incorporating practices that promote mindfulness and holistic well-being.

The learning trajectory in this course rests upon six foundational principles:

1. Working in education is a moral act, grounded in an ethic of care.
2. The essence of education lies in collaboration and collegiality.
3. Reflection and inquiry are at the core of educational endeavors.
4. Education, in its essence, is a political act with societal ramifications.
5. Learning is intrinsically constructivist and is a developmental journey.
6. Educational pursuits involve the synthesis of subject matter and professional knowledge.

CA Teaching Performance Expectations

The Teaching Performance Expectations (TPEs) comprise the body of knowledge, skills, and abilities that beginning educators learn in their teacher preparation program. These can be found in detail [here](#) (TPEs 1-6) and [here](#) (TPE 7):

Please note this syllabus includes hyperlinks with additional information to some assignments. They will be highlighted and formatted in the same manner.

TPE Mapping:

Week 1: Understanding Curriculum and Instruction Issues

Content/Readings: "Understanding Curriculum and Instruction in Secondary STEM" from "Teaching STEM in the Secondary School: Helping Teachers Meet the Challenge" by Paul B. Kelter and Samuel R. Micklus; "Framework for Teaching Science and Math" (California Department of Education).

TPEs Introduced: 1.3, 3.1, 3.2, 7.9.

Workshop/Theme: Technology integration: Exploring digital resources for STEM instruction.

TPEs Practiced: 1.3, 7.9.

Assignments/Tasks: [STEM Curriculum Alignment Project](#)

TPEs Assessed: 3.1, 3.2, 4.3.

Week 2: Differentiated Instruction and Technology Integration

Content/Readings: "Differentiating Instruction in Secondary STEM" from "Teaching STEM in the Secondary School: Helping Teachers Meet the Challenge" by Paul B. Kelter and Samuel R. Micklus; "Integrating Technology in the Mathematics Classroom" by Michaelleen M. Fisher; "Teaching Science with Technology: Case Studies of Science Teachers' Development of Technology, Pedagogy, and Content Knowledge" by Myint Swe Khine and Issa M. Saleh.

TPEs Introduced: 1.3, 1.4, 3.2, 7.9.

Workshop/Theme: Differentiated instruction strategies for diverse learners in STEM classrooms; Technology integration best practices in math and science instruction.

TPEs Practiced: 1.4, 7.9.

Assignments/Tasks: [Technology Integration Project](#)

TPEs Assessed: 1.4, 3.1, 3.2, 5.1, 5.2.

Week 3: Formative and Summative Assessment Design

Content/Readings: "Assessment and Science Education" by Dylan William; "Using Classroom Assessment to Improve Student Learning" by Thomas R. Guskey.

TPEs Introduced: 5.1, 5.2.

Workshop/Theme: Understanding formative and summative assessments in math and science; Formative assessment techniques to inform instruction.

TPEs Practiced: 5.1, 5.2.

Assignments/Tasks: [Differentiated Instruction Lesson Plan](#)

TPEs Assessed: 1.4, 3.1, 3.2, 4.3, 5.1, 5.2.

Week 4: Final Project Presentations and Reflection

Content/Readings: Recap and reflections.

TPEs Introduced: None (focus on assessments and projects).

Workshop/Theme: Final project presentations: Curriculum unit designs; Peer feedback and reflections on the final project.

TPEs Practiced: 1.3, 1.4, 3.1, 3.2, 4.3, 5.1, 5.2, 7.9.

Assignments/Tasks: [Formative and Summative Assessment Design](#); [Final Project: Curriculum Unit Design](#)

TPEs Assessed: 1.3, 1.4, 3.1, 3.2, 4.3, 5.1, 5.2, 7.9.

Course Policies

Attendance and Participation: Given the interactive nature of this course, attendance and active participation are vital for your learning. Students are expected to attend all synchronous sessions and engage in asynchronous activities. If you cannot attend a synchronous session, please notify the instructor in advance.

Late Assignments: Late assignments will be accepted with a penalty of 10% per day late. No assignments will be accepted more than one week past the due date unless extenuating circumstances exist, and arrangements have been made with the instructor.

Academic Integrity: This course adheres strictly to the university's policy on academic integrity. Plagiarism, or any form of cheating, will not be tolerated and will result in a failing grade for the assignment or the course, and possible further disciplinary action.

Respect and Inclusivity: Our classroom is a place of learning and respectful dialogue. Demeaning, hostile, or inappropriate behavior will not be tolerated. It is important that we maintain an environment of respect and inclusivity where all voices can be heard and all perspectives valued.

Accessibility: If you need accommodations due to a disability, please contact the university's accessibility services as soon as possible. I am committed to providing an accessible learning environment for all students.

Communication: Please use your university email for all course-related communications and expect a response within 48 hours during weekdays. For urgent matters, please use the subject line "Urgent: [Your Name]".

Technology Use: In our hybrid course model, technology will be central. Please ensure you have reliable access to a computer and internet connection. If you face difficulties, inform your instructor as soon as possible. During synchronous sessions, please keep your microphone muted when not speaking and use the chat function for questions or comments, unless otherwise instructed.

Remember, course policies are designed to ensure a positive and productive learning environment for all students. Failure to adhere to these policies may

impact your course grade.

University Policies

Academic Integrity

A commitment to the principles of academic integrity is essential to the mission of Northeastern University. The promotion of independent and original scholarship ensures that students derive the most from their educational experience and their pursuit of knowledge. Academic dishonesty violates the most fundamental values of an intellectual community and undermines the achievements of the entire University.

As members of the academic community, students must become familiar with their rights and responsibilities. In each course, they are responsible for knowing the requirements and restrictions regarding research and writing, examinations of whatever kind, collaborative work, the use of study aids, the appropriateness of assistance, and other issues. Students are responsible for learning the conventions of documentation and acknowledgment of sources in their fields. Northeastern University expects students to complete all examinations, tests, papers, creative projects, and assignments of any kind according to the highest ethical standards, as set forth either explicitly or implicitly in this Code or by the direction of instructors. Go to <http://www.northeastern.edu/osccr/academic-integrity-policy/> to access the full academic integrity policy.

Diversity and Inclusion

Northeastern University is committed to equal opportunity, affirmative action, diversity and social justice while building a climate of inclusion on and beyond campus. In the classroom, member of the University community work to cultivate an inclusive environment that denounces discrimination through innovation, collaboration and an awareness of global perspectives on social justice. Please visit <http://www.northeastern.edu/oidi/> for complete information on Diversity and Inclusion

TITLE IX

Title IX of the Education Amendments of 1972 protects individuals from sex or gender-based discrimination, including discrimination based on gender-identity, in educational programs and activities that receive federal financial assistance.

Northeastern's Title IX Policy prohibits Prohibited Offenses, which are defined as sexual harassment, sexual assault, relationship or domestic violence, and stalking. The Title IX Policy applies to the entire community, including male, female, transgender students, faculty and staff.

Please visit www.northeastern.edu/titleix for a complete list of reporting options and resources both on- and off-campus.

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Campus Support Services

This section provides an overview of the broad range of support services available to students at Northeastern University and Mills College at Northeastern University. Students have access to numerous services to ensure their successful university journey.

Learner Experience, Support, and Resources:

- [Office for University Equity and Compliance](#)
- [University Health and Counseling Services](#)
- [Office of Diversity, Equity and Inclusion](#)
- [Center for Leadership, Equity, and Excellence](#)
- [Career Design](#)
- [Library Services](#)
- [Student Access and Support Services Office](#) | Accommodations, Writing and Tutoring Center
- [Connect To Tech: Information Technology Services](#)
- [Student Financial Services](#) | Financial Aid and Accounts

Course Materials

Materials posted to Canvas are for class use and may not be duplicated, sold, or distributed. Students may download and print information for personal use as a student in the class. This is consistent with Fair Use under intellectual property protection.

Required Readings: This course requires no textbook. All readings and related materials will be posted on the course's Canvas site.

See also Recommended Resources for Teachers (below)

Assignments

Please note this syllabus includes hyperlinks with additional information to some assignments. They will be highlighted and formatted in the same manner.

1. STEM Curriculum Alignment Project (20% of final grade)

Description: In this assignment, teacher candidates will select a specific unit or topic from their math or science curriculum and align it with the relevant content standards and state frameworks. They will demonstrate how the content aligns with the structure of knowledge in the subject area and how it supports student learning and engagement.

Grading Criteria:

- Clear alignment of the curriculum with specified content standards and frameworks
- Comprehensive explanation of how the content aligns with the structure of knowledge in the subject area
- Demonstration of how the alignment supports student learning and engagement

2. Technology Integration Project (15% of final grade)

Description: Teacher candidates will create a technology-integrated lesson plan or activity that enhances student engagement and learning in math or science. They will explore various technology tools and resources to support instruction, and they should demonstrate how technology is used as an effective instructional tool to achieve specific learning objectives.

Grading Criteria:

- Creative and effective use of technology tools and resources in the lesson plan
- Clear alignment of technology use with learning objectives and TPEs
- Demonstration of how technology enhances student engagement and learning

3. Differentiated Instruction Lesson Plan (20% of final grade)

Description: In this assignment, teacher candidates will develop a differentiated lesson plan for a specific math or science topic. **The lesson plan** will include strategies to address the diverse learning needs of students in the classroom. They should consider how to adapt instruction, materials, and assessments to meet the needs of all learners effectively.

Grading Criteria:

- Effective differentiation strategies that address diverse learning needs
- Clear alignment of the lesson plan with learning objectives and TPEs
- Demonstration of how the differentiated instruction supports student success

4. Formative and Summative Assessment Design (15% of final grade)

Description: Teacher candidates will design formative and summative assessments for the differentiated lesson plan developed in Assignment 3. They will demonstrate the ability to align assessments with learning objectives and provide actionable feedback to students. Additionally, they should show how these assessments inform instructional decisions.

Grading Criteria:

- Clear alignment of assessments with learning objectives and TPEs
- Demonstration of formative assessment practices for ongoing feedback
- Effective design of summative assessments for evaluating student learning

5. Final Project: Curriculum Unit Design (30% of final grade)

Description: This comprehensive final project will task teacher candidates with designing a complete curriculum unit for a selected topic in math or science. The unit should include detailed lesson plans, assessments, instructional materials, and technology integration, showcasing their ability to apply all concepts covered in the course. The curriculum unit should demonstrate effective planning and organization to support student learning and engagement.

Grading Criteria:

- Clear and cohesive organization of the curriculum unit
- Comprehensive lesson plans and instructional materials
- Effective use of technology to enhance learning experiences
- Alignment of the curriculum unit with specified learning objectives and TPEs

This **analytic rubric** will be used to evaluate your work.

Grading

All assignments in this course will be graded using a point system. Class attendance and participation are required. Students will have opportunities to engage in the class through discussions, presentation, and class activities.

College policy on incomplete courses is as follows: students qualify for incomplete grades only if they have completed 2/3 of the total coursework and are responding to unforeseen circumstances. In this course, students will qualify for consideration of an incomplete only if the required internship timeline goes beyond the semester. Students who have not completed substantial coursework should not assume that they will be given an incomplete at the end of the semester.

Grades	Assignment	Points
97-100 A	STEM Curriculum Alignment Project	20
93-96 A-	Technology Integration Project	15
88-92 B+	Differentiated Instruction Lesson Plan	20
83-87 B	Formative and Summative Assessment Design	15
79-82 B-	Final Project: Curriculum Unit Design	30
76-78 C+		
73-75 C		
70-72 C-		
	Total	100

Schedule

This calendar provides a comprehensive overview of the course activities and expectations. It should be adapted based on actual semester dates, student needs, and specific course content.

Please note that synchronous sessions do not meet consecutively. Be sure to note the class meeting dates and times in your calendar.

Readings and assignments are due on the date within the same row.

See TPE mapping on pg. 5		
Week # Date	Synchronous	Asynchronous
1	<i>Understanding Curriculum and Instruction Issues</i> • Welcome and course overview (15 minutes) • Introduction to curriculum and instruction issues in secondary math and science (30 minutes) • Discussion and analysis of state and local frameworks for secondary subjects (1 hour) • Group activity: Analyzing sample curriculum units (1 hour) • Break (15 minutes) • Technology integration workshop: Exploring digital resources for STEM instruction (1 hour) • Q&A and wrap-up (15 minutes)	Readings: • Chapter 1: "Understanding Curriculum and Instruction in Secondary STEM" from "Teaching STEM in the Secondary School: Helping Teachers Meet the Challenge" by Paul B. Kelter and Samuel R. Micklus • Choose: ○ Math Framework (CDE) ○ Science Framework (CDE) • Assignment 1: STEM Curriculum Alignment Project (Due at the end of Week 2)
2	<i>Differentiated Instruction and Technology Integration</i> • Summer overview - Scientific literacy • Your experiences in math and science Journal Entry • Creating the goals/vision of your classroom - Brainstorming Tool - Smart-e goal(s) • Differentiated instruction strategies for diverse learners in STEM classrooms (45 min) • Technology integration best practices in math and science instruction (45 min) • Pedagogical Exercise (1 hour) ○ Math ○ Science	Readings: • Chapter 2: "Differentiating Instruction in Secondary STEM" from "Teaching STEM in the Secondary School: Helping Teachers Meet the Challenge" by Paul B. Kelter and Samuel R. Micklus • "Integrating Technology in the Mathematics Classroom" by Michaelleen M. Fisher • "Teaching Science with Technology: Case Studies of Science Teachers' Development of Technology, Pedagogy, and Content Knowledge" by Myint Swe Khine and Issa M. Saleh

See TPE mapping on pg. 5		
Week # Date	Synchronous	Asynchronous
	• Technological literacy in STEM and reading skills; what's the difference? • Break (15 minutes) • Workshop: Designing differentiated lessons with technology integration (1 hour) • Q&A and wrap-up (15 minutes)	• Richardson, Morgan, & Fleener (Chapter 1). "Reading to Learn in the Content Areas" • Assignment 2: Technology Integration Project (Due at the end of Week 3)
3	Formative and Summative Assessment Design • Recap and questions on Week 2 content (15 minutes) • Backwards planning year-design (understanding by design) • Understanding formative and summative assessments in math and science • Formative assessment techniques to inform instruction (1 hour) • Workshop: Designing effective summative assessments (1 hour) • Break (15 minutes) • Peer feedback and review session for Assignment 1 (45 minutes) • Q&A and wrap-up (15 minutes)	Readings: • "Assessment and Science Education" by Dylan Wiliam • "Using Classroom Assessment to Improve Student Learning" by Thomas R. Guskey • Assignment 3: Differentiated Instruction Lesson Plan (Due at the end of Week 4)
4	Final Project Presentations and Reflection • Recap and questions on Week 3 content (15 minutes) • Final project presentations: Curriculum unit designs (2 hours) • Peer feedback and reflections on final project (1 hour) • Course wrap-up: Key takeaways and next steps (30 minutes) • Course evaluation and feedback (15 minutes)	• Finalize and submit Assignment 4: Formative and Summative Assessment Design (Due at the end of Week 4) • Work on Final Project: Curriculum Unit Design (Due at the end of the course)

Recommended Resources for Teachers – Evolving List

Recommended Resources and Professional Organizations - Across Content Areas:

- ★ Rethinking Schools (they have a magazine you can subscribe to, and excellent books):

★ http://www.rethinkingschools.org/index.shtml ★ Cultofpedagogy blog: http://www.cultofpedagogy.com/category/rants-and-pep-talks/ ★ Teaching for change reading list: https://www.teachingforchange.org/2016-summer-reading ★ Voices in Urban Education: http://www.annenberginstitute.org/publications
Organizations
★ Teachers 4 Social Justice: https://t4sj.org ★ People's Education Movement - Bay Area: https://peoplesedbayarea.wordpress.com ★ California chapter of National Association for Multicultural Education: http://californianame.nationbuilder.com
Materials
★ Social justice-oriented classroom posters: http://www.progressivecatalog.com/catalog/sociusposter.html - Planning to Change the World - Social justice planner for teachers: www.justiceplanbook.com
Restorative Justice + Mental Health
★ Mental health website tool for teachers: https://www.classroommentalhealth.org
Standards
★ Common Core: http://www.corestandards.org/read-the-standards/ ★ http://www.socialstudies.org/system/files/c3/C3-Framework-for-Social-Studies.pdf ★ http://www.cde.ca.gov/be/st/ss/ ★ https://www.cde.ca.gov/be/st/ss/vapacontentstds.asp
Recommended Resources and Professional Organizations - Science:
★ Teaching Tolerance: https://www.tolerance.org/magazine/summer-2013/just-science ★ http://www.asbmb.org/asbmbtoday/201403/Outreach/ ★ http://www.kzoo.edu/praxis/category/science/ ★ Teaching Science for Social Justice book: https://www.amazon.com/Teaching-Science-Social-Justice-Paperback/dp/0807743836 ★ People's Curriculum for the Earth: https://www.rethinkingschools.org/books/title/a-people-s-curriculum-for-the-earth