

# **ECU 582: Content and Resources in STEM and Science Education**

## **School of Education and Leadership**

6 Credits

Effective Date 7/1/2021

Prerequisite: Admission to M.Ed. program.

*Access to the Internet is required.*

*All written assignments must be in Microsoft-Word-compatible formats.*

*See the library's APA Style Guide tutorial for a list of resources that can help you use APA style.*

## Faculty Information

Professional experience information for instructors is found under *Faculty Information* in the online course menu.

## Contact Information

Contact information for instructors is found under *Faculty Information* in the online course menu.

## Course Description

This course introduces candidates to content and resources in science, technology, engineering, and mathematics (STEM) education. The course emphasizes building science content knowledge and applying that knowledge to instruction in the K-12 classroom. Candidates learn about Next Generation Science Standards (NGSS), and the four areas of NGSS: Life Science, Physical Science, Earth & Space Science, and Engineering & Technology. Candidates learn about scientific investigations, inquiry-based learning, and teaching science based on anchoring phenomena.

## Course Resources

Required and recommended resources to complete coursework and assignments are found on the course [Reading List](#). The reading list can be found under *Course Information* in Blackboard as well as from the library homepage (“Find Your Textbook” button).

**Note:** Required resources that must be purchased by the student are tagged “Purchase from a vendor of your choosing.” Required resources with a direct link, “Available through CityU Library”, are available electronically at no cost to students.

Students in Canada may purchase course resources from the [Canada Bookstore](#), and students outside the U.S. and Canada should contact their advisor or textbook coordinator for additional information.

## Course Outcomes

This course will prepare students to:

- Synthesize knowledge of STEM content by planning multi-dimensional instruction.
- Anticipate and plan for students’ alternative conceptions/misconceptions related to STEM content.
- Demonstrate leadership in STEM and science education.

- Evaluate and apply research and theory related to best practices in STEM education.
- Demonstrate a commitment to equity and culturally responsive teaching in STEM education.

## Shared Agreements

Our primary commitment is to **build relationships** both with each other and within ourselves. We share a **collective goal** of becoming critically conscious educators who are prepared to serve all students in our classrooms. A positive learning experience relies on creating an atmosphere where space is held for **multiple truths** to coexist, and where we begin to **notice and name power dynamics** in our own group and also in the education system, its processes, and its policies. We acknowledge that differences among our identities, social backgrounds and experiences will influence our perspectives and those of others. We agree to **share our truths bravely**, to **acknowledge the humanity** of each other and ourselves, and to **look for learning** in ourselves and others.

*\*\*We agree to keep confidential all issues of a personal or professional nature that are discussed in class.\*\**

*\*\*adapted from Color Brave Spaces by Equity Matters (2021). [www.equitymattersnw.com](http://www.equitymattersnw.com)*

## Additional Information

This is a new heading for our syllabus template. Programs are using this to list additional information required by accreditors, or core concepts/knowledge/skills.

## Grading Scale

The grades earned for the course will be calculated using City University of Seattle's decimal grading system, found in the current University Catalog (<https://www.cityu.edu/catalog/>).

Grading rubrics with details on how each assignment will be graded are located under *Assignments* and/or in *My Grades* in the online course menu. Students should review the rubric for each assignment prior to completing their work in order to understand how it will be assessed.

## Course Assignments and Grading

### **Life Science Content Exploration (20% of Final Grade)**

Candidates will create a product (e.g., lesson plan, video, PowerPoint, paper) to demonstrate understanding of one to two NGSS life science performance expectations. The product should include the following: 1) explanation of the three dimensions within the selected performance expectation(s), 2) a description of common misconceptions pertaining to the performance expectation(s), 3) explanation of why the misconception is likely to occur and a plan for addressing the misconception, and 4) equitable and culturally responsive approaches to teaching the performance expectation(s) and addressing the misconception.

### **Physical Science Content Exploration (20% of Final Grade)**

Candidates will create a product (e.g., lesson plan, video, PowerPoint, paper) to demonstrate understanding of one to two NGSS physical science performance expectations. The product should include the following: 1) explanation of the three dimensions within the selected performance expectation(s), 2) a description of common misconceptions pertaining to the performance expectation(s), 3) explanation of why the misconception is likely to occur and a plan for addressing the misconception, and 4) equitable and culturally responsive approaches to teaching the performance expectation(s) and addressing the misconception.

### **Earth and Space Sciences Content Exploration (20% of Final Grade)**

Candidates will create a product (e.g., lesson plan, video, PowerPoint, paper) to demonstrate understanding of one to two NGSS earth and space sciences performance expectations. The product should include the following: 1) explanation of the three dimensions within the selected performance expectation(s), 2) a description of common misconceptions pertaining to the performance expectation(s), 3) explanation of why the misconception is likely to occur and a plan for addressing the misconception, and 4) equitable and culturally responsive approaches to teaching the performance expectation(s) and addressing the misconception.

### **Engineering Content Exploration (20% of Final Grade)**

Candidates will create a product (e.g., lesson plan, video, PowerPoint, paper) to demonstrate understanding of one to two NGSS engineering performance expectations. The product should include the following: 1) explanation of the three dimensions within the selected performance expectation(s), 2) a description of common misconceptions pertaining to the performance expectation(s), 3) explanation of why the misconception is likely to occur and a plan for addressing the misconception, and 4) equitable and culturally responsive approaches to teaching the performance expectation(s) and addressing the misconception.

### **Participation, Engagement, and Essential Dispositions (20% of Final Grade)**

Candidates should participate and engage in all classwork, including required assignments, class discussions, activities, and instructor-determined assignments. Candidates should work to meet essential dispositions criteria not only in the field, but also in their coursework, whether online or in person

## **Course Policies**

Participation will be graded based on engagement in class discussions and activities (both online and mixed modes). Online-only courses will be determined via active engagement in weekly discussion boards or other interactive opportunities provided by the instructor. Mixed mode courses will be determined based on presence in class and engagement with content and peers both within and outside of face-to-face class sessions.

## **University Policies**

You are responsible for understanding and adhering to all of City University of Seattle's academic policies. The most current versions of these policies can be found in the University Catalog that is linked from the CityU Web site.

### **Antidiscrimination**

City University of Seattle and its staff and faculty are committed to supporting our students. We value equity, diversity, and inclusion as a way of life as well as the educational opportunities it provides. City U will not tolerate any form of discrimination based on race, color, ethnicity, sexual orientation, gender identification, socioeconomic status, or religious values. If you have experienced any discrimination based on any of the above, we encourage you to report this to the University. Please report this to your instructor. If you do not feel safe reporting this to your instructor, please report to the Provost or to the Vice President of Student Affairs.

### **Non-Discrimination & Prohibition of Sexual Misconduct**

City University of Seattle adheres to all federal, state, and local civil rights laws prohibiting discrimination in employment and education. The University is committed to ensuring that the education environment is bounded by standards of mutual respect and safety and is free from discriminatory practices.

In the U.S., the University is required by Title IX of the Education Amendments of 1972 to ensure that all of its education programs and activities do not discriminate on the basis of sex/gender. Sex includes sex, sex stereotypes, gender identity, gender expression, sexual orientation, and pregnancy or parenting status. Sexual harassment, sexual assault, dating and domestic violence, and stalking are forms of sex discrimination, which are prohibited under Title IX and by City University of Seattle policy. City University of Seattle also prohibits retaliation against any person opposing discrimination or participating in any discrimination investigation or complaint process internal or external to the institution. Questions regarding Title IX, including its application and/or concerns about noncompliance, should be directed to the Title IX Coordinator. For a complete copy of the policy or for more information, visit <https://my.cityu.edu/titleix> or contact the Title IX Coordinator.

In Canada, in compliance with the British Columbia Human Rights Code, the Alberta Human Rights Act, WorksafeBC, and the Workers' Compensation Board of Alberta, the University believes that its environment should at all times be supportive and respectful of the dignity and self-esteem of individuals. Discrimination, harassment and bullying conduct, whether through person-to-person behaviour or via electronic communications such as email or social media is not acceptable and will not be tolerated. As an educational institution, it is our responsibility to cultivate an environment of excellence, equity, mutual respect and to recognize the value and potential of every individual. The University will take all necessary steps to meet or exceed the requirements of the law to prevent discrimination, harassment and bullying. The Respectful Workplace Policy for the prevention of discrimination, harassment and bullying policy and procedure can be found at <https://www.cityu.edu/discover-cityu/about-cityu/> under the Policies section or at <https://www.cityuniversity.ca/about/>.

## **Religious Accommodations**

City University of Seattle has a policy for accommodation of student absences or significant hardship due to reasons of faith or conscience, or for organized religious activities. The University's policy, including more information about how to request an accommodation, is available in the University Catalog and on the my.cityu.edu student portal. Accommodations must be requested by the 20% mark of this course (e.g. day 14 of a ten-week course, day 7 of a 5-week course) using the Religious Accommodations Request Form found on the student dashboard in the my.cityu.edu student portal.

## **Academic Integrity**

Academic integrity in students requires the pursuit of scholarly activity that is free from fraud, deception and unauthorized collaboration with other individuals. Students are responsible for understanding CityU's policy on academic integrity and adhering to its standards in meeting all course requirements. A complete copy of this policy can be found in the [University Catalog](#) in the section titled *Academic Integrity Policy* under *Student Rights & Responsibilities*.

## **Attendance**

Students taking courses in any format at the University are expected to be diligent in their studies and to attend class regularly. Regular class attendance is important in achieving learning outcomes in the course and may be a valid consideration in determining the final grade. For classes where a physical presence is required, a student has attended if they are present at any time during the class session. For online classes, a student has attended if they have posted or submitted an assignment. A complete copy of this policy can be found in the [University Catalog](#) in the section titled *Attendance* under *Student Rights & Responsibilities*.

## **Final Assignments Due Date**

Final assignments for each class at CityU must be due on or before the final date of the course as indicated in the university's course information system. Due dates that extend beyond the final date of the course may negatively impact tuition funding for students.

# **Support Services**

## **Disability Services Accommodations Statement**

Students with documented disability who wish to request academic accommodations are encouraged to contact Disability Support Services to discuss accommodation requests and eligibility requirements. Please contact Disability Support Services at [disability@cityu.edu](mailto:disability@cityu.edu) or 206.239.4752 or visit the [Disability Support Services](#) page in the my.cityu.edu portal. Confidentiality will be observed in all inquiries. Once approved, information about academic accommodations will be shared with your course instructors.

## **Library Services**

CityU librarians are available to help students find the resources and information they need to succeed in this course. Contact a CityU librarian through the [Ask a Librarian](#) service, or access [library resources and services](#) online, 24 hours a day, seven days a week.

## **Smarthinking Tutoring**

CityU students have 24/7 access to free online tutoring offered through Smarthinking, including writing support, from certified tutors. Contact CityU's Student Support Center at [mycityusupport@cityu.edu](mailto:mycityusupport@cityu.edu) to request a username and password.