

EDUC 535.17 S01 Specialization II: Secondary Science  
Fall, 2023

Section	Instructor	Time	Location	Email
S01	Gabriela Alonso Yáñez	W 12:00 – 3:50	EDT 01	galonsoy@ucalgary.ca

**Class Dates:** Wednesday, 12:00 – 3:50

Sept. 6, 13, 20, 27; Oct. 4, 11, 18, 25, 2023 (Orange dates – Assignment due)

**Last Day to Add/Drop/Swap:** Due to the non-standard dates associated with this program, please check your Student Centre for the important dates pertaining to your section.

**Pre-requisite:** Due to the multiple pathways in the Bachelor of Education, please consult Undergraduate Programs in Education for questions related to pre-requisite courses.

**Office Zoom Hours:** Available after class or by appointment

*Please, always add EDUC 535 in the subject line of your e-mail so I can prioritize your communication.*

**Email:** Students are required to use a University of Calgary (@ucalgary.ca) email address for all correspondence.

**Course design and deliverables:** This course will be delivered face-to-face on campus with engagement in a D2L environment.

**COURSE DESCRIPTION:**

The intent of the Specialization Seminar II is to deepen your understanding of the practical aspects of teaching within the specialization and to connect this practice with specific theoretical concepts. While this second specialization course focuses more on practical knowledge, you will also refine your knowledge of discourse and theory within the discipline and develop a deeper understanding of ways to enact this theory in a classroom context. You will additionally become familiar with any relevant Ministry documents associated with the Alberta Curriculum and draw on practical classroom observation from the field experience to participate in meaningful discussion and to connect these observations with a vision for your own teaching. The emphasis of the course is on designing for student learning (subject-specific; assessment to strengthen student learning and improve instruction; and designing for inclusion, differentiation, and inquiry).

**Extended Course Overview:**

The intent of the Specialization Seminar II is to deepen students' understanding of the practical aspects of teaching within the specialization of science and to connect this practice with specific theoretical concepts and broader social contexts. In this course, students will be provided with

opportunities to refine their knowledge of theories and pedagogies within the science classroom context.

Special emphasis will be placed in presenting concepts and models that can provide young learners with an opportunity to learn how complex systems function and to understand that solutions to current global problems require a science that integrates an interdisciplinary approach accommodating multiple, and often divergent, perspectives.

Students will also become familiar with relevant Ministry documents associated with the Alberta Curriculum and draw on practical experiences of science education to participate in meaningful discussions and to connect these observations with a vision for their own teaching. The emphasis of the course is on designing for student learning in science (subject-specific; assessment to strengthen student learning and improve instruction; and designing for inclusion, differentiation, and inquiry).

### Learner Outcomes:

Over the course of the semester, students will

- 1) Further develop a deeper conceptual understanding of the historical, socio-cultural, political contexts of *Science*, and relate this to curriculum planning in the science specialization area;
- 2) Identify and critique the *key learning design principles* (in connection to the front matter of the Programs of Study) and the significance of *intentions* (learning objectives) across the Alberta Programs of Study;
- 3) Successfully apply theoretical knowledge about curriculum design and will create a long-term unit and assessment plan in the subject area of science.

**Required Resources:** All required resources can be found in the weekly schedule. Additional class readings and other support resources will be posted on the course shell in D2L prior to class. It is your responsibility to keep up with materials and announcements posted on D2L.

### Assignments Overview:

	DESCRIPTION OF LEARNING TASK	GROUPING	WEIGHT	DUE DATE
#1	Group Inquiry Project	Group	40%	Sept. 20
#2	Unit and Assessment Plan	Individual	40%	Oct. 18
#3	Evolving Conceptual Understanding of Science	Individual	20%	Oct. 25

## Assignments

*The course is structured around the completion of three assignments. The assignment descriptions and assessment details will be discussed in class. The instructor will facilitate the ongoing work and will support students as they engage in the assignments by providing ongoing, timely and constructive feedback to further learning.*

### I. Assignment 1: Group Inquiry Project, 40%, Due: Wednesday, September 20<sup>th</sup> 2023

For this assignment, students will develop a topic of inquiry/key question to be explored within the discipline. This question should emerge from class activities, discussion with peers and class readings and should be connected to the development of your final longer-term unit plan (Assignment 3). Small groups will investigate the topic through research into resources within the discipline and through group discussion of personal experiences and observations.

Findings of the inquiry project will be shared electronically via a digital folder to be uploaded on D2L on the date due. This folder can include text, visuals, media, and links. Be creative in the development of this folder.

1. Overarching question of inquiry- An explanation of your inquiry question including: a clear statement of the question, your reasons for asking this question.
2. A summary of your conclusion or findings as well as new or further questions raised as a result of your new learning. Include a digital collection illustrating the evidence for your findings. You can create these and/or share existing links or examples (where copyright permits). The connection to your inquiry question should be made clear.
3. List of resources used in the project completion (APA 7<sup>th</sup> edition).

### Grading Criteria for Assignment 1

Group inquiry projects will be assessed on the following criteria:

#### 1. Quality and meaningfulness of research question and resources used in investigation

- Clarity of presentation of the inquiry question
- Fullness of rationale for the question
- Meaningfulness to pre-service teachers within the discipline
- Significance and relevance of resources; correct citation

#### 2. Overall Presentation of findings

- Organization, clarity, and succinctness of digital folder
- Specificity of references made to resources
- Effectiveness of writing to convey the brainstorming and key findings of the group
- Strength of summary of findings

3. Digital folder design elements used in representation of group inquiry question and findings

- Effectiveness of visuals in depicting issues raised in inquiry
- Clear, relevant, and striking use of visuals and/or technology and media
- Connectedness between inquiry question, supporting text, and use of visual content

### Summary of Grading Based on Above Criteria

An *A+ to A* project will present a significant research question with a clear rationale and exceptional explication of findings that are organized, well written, and supported. The digital folder will employ engaging and clearly connected visuals.

An *A- to B+* project will be guided by a good research question with a supporting rationale and generally well written and developed findings that are paired with research support and some examples. The digital folder will include mainly relevant and strong visuals.

A *B to C+* project may present a roughly sketched research question in need of some refinement, a somewhat developed rationale, and findings that are lacking in some clarity, development, and/or examples. The digital folder will include many images and files, but may not be complete or may hold examples that are not connected to the project.

### II. Assignment 2: Design a Unit and Assessment Plan, 40%, Due: Wednesday October 18, 2023

For this assignment, students will work individually to design a unit learning plan, illustrative of key aspects of curriculum and educational research introduced in the course. The learning design and the theoretical framework supporting it will be posted online for analysis and “feedforward” suggestions from members of the class.

Task components:

1. You will design a unit-plan for learning and assessment plan to sponsor deep understanding of science.
2. You will include a rationale for the learning plan, as supported by theory and discipline.
3. Discussion of practicalities of enacting this learning and assessment plan: fitting it into a larger context/concept, integration of effective formative assessment strategies for scaffolding/learning progression and adapting to the needs of diverse learners.

**Grading Criteria for Assignment Two**

Criteria for assessment
<p><b>Build and deepen understanding</b></p> <p>Help develop strong learning tasks that focus students on issues, questions and problems central to the discipline.</p>
<p><b>Informed by disciplinary knowledge/Programs of Study</b></p> <p>Makings meaningful connections to ways of thinking about the discipline, and in alignment with the Programs of Study in your disciplinary area.</p>
<p><b>Authentic and engaged learning</b></p> <p>Learning is meaningful and relevant to students and to the broader community, and that are of real concern and central to the discipline.</p>
<p><b>Balanced assessment</b></p> <p>Assessment of learning provides a comprehensive and holistic picture of student learning and competencies.</p>
<p><b>Differentiated learning</b></p> <p>Addresses the diversity and range of students' needs</p> <p>(must include three ways in which your plan addresses the diverse needs of students, one of which must include ELL strategies or integration).</p>

**III. Assignment 3: Evolving Conceptual Understanding of Science, 20% Due Wednesday, October 25th 2023.**

**MULTIMODAL RESPONSE TO:**

**“How has your conceptualization of Science changed?”**

The purpose of the assignment is for you to respond to the above question as way of reflecting thoughtfully on the pedagogical content knowledge in your subject area. Your response may take a number of forms. It could be a conventional academic essay, an imagined Socratic dialogue between a teacher and student, an illustrated story, an animation, a short video or a podcast. However, all responses must be persuasive – that is, you must fashion a personal stand on the question(s), and then set out to prove your interpretation using *relevant and varied evidence*.

All responses must refer to at least two of the following sources:

- Alberta Education Programs of Study
- At least 3 articles or chapters read during the course

You may also want to draw upon:

- Discussions in your inquiry groups
- Readings from this course and previous courses
- Observations made during your field experience

### Criteria

Your response should:

- Articulate a clear, insightful and persuasive argument
- Draw upon relevant evidence from the readings to support the argument
- Demonstrate an emerging understanding of concepts and theories related to the teaching of the discipline
- Use an appropriate mode of expression in a way that is sophisticated, clear and accurate.
- Include at least 3 peer reviewed references, and cited in APA 7<sup>th</sup> edition.

*Tentative Schedule of weekly activities/readings (topics and activities subject to change)*

Topics/Themes	Readings and Assignments
<p>Sept. 6, 13 (Weeks 1 &amp; 2)</p> <p><b>1. Welcome &amp; Introduction</b></p> <p>Students understanding in Science</p> <p><b>2. Field activity</b></p> <p>Meeting at the Duck Pond (location details provided in class).</p>	<p>Beach, R. (2023). Addressing the Challenges of Preparing Teachers to Teach about the Climate Crisis. <i>The Teacher Educator</i>, 1-16.  <a href="https://ucalgary.primo.exlibrisgroup.com/permalink/01UCALG_INST/15o3ob6/cdi_informaworld_taylorfrancis_310_1080_08878730_2023_2175401">https://ucalgary.primo.exlibrisgroup.com/permalink/01UCALG_INST/15o3ob6/cdi_informaworld_taylorfrancis_310_1080_08878730_2023_2175401</a></p> <p>Enger, S. K., &amp; Yager, R. E. (2009). <i>Assessing student understanding in science: A standards-based K-12 handbook</i>. Corwin Press (Chapter One, pages 1-11)  <a href="https://ebookcentral-proquest-com.ezproxy.lib.ucalgary.ca/lib/ucalgary-ebooks/reader.action?docID=1104962&amp;ppg=1">.https://ebookcentral-proquest-com.ezproxy.lib.ucalgary.ca/lib/ucalgary-ebooks/reader.action?docID=1104962&amp;ppg=1</a></p> <p>Big ideas in Science – (Pages 21 and 22)  <a href="https://www.ase.org.uk/bigideas">https://www.ase.org.uk/bigideas</a></p>
<p>Sept. 20 (Week 3)</p> <p>In class work time &amp; feedback group work</p>	<p><b>Assignment 1 Due September, 20<sup>th</sup> 2023 - 40%</b></p>
<p>Sept 27 &amp; Oct. 4, 11(Weeks 4,5 &amp; 6)</p> <p>Designing a Unit and Assessment Plan</p> <p>Identify and critique key learning perspectives in the Alberta Program of Studies</p>	<p>Wiggins, G. (2005). <i>Understanding by design: Overview of UbD &amp; the design template</i>.  <a href="https://wpvip.edutopia.org/wp-content/uploads/2022/10/stw-normal-park-normal-understanding-by-design.pdf">https://wpvip.edutopia.org/wp-content/uploads/2022/10/stw-normal-park-normal-understanding-by-design.pdf</a></p> <p>Duschl, R. A. (2019). Learning progressions: Framing and designing coherent sequences for STEM education. <i>Disciplinary and Interdisciplinary Science Education Research</i>, 1(1), 1-10.  <a href="https://ucalgary.primo.exlibrisgroup.com/permalink/01UCALG_INST/15o3ob6/cdi_doaj_primary_oai_doaj_org_article_1df65199577c4b20b8b4e0d1b3862691">https://ucalgary.primo.exlibrisgroup.com/permalink/01UCALG_INST/15o3ob6/cdi_doaj_primary_oai_doaj_org_article_1df65199577c4b20b8b4e0d1b3862691</a></p> <p>Alberta Science Program of Study.  <a href="https://www.learnalberta.ca/ProgramsOfStudy.aspx?lang=en&amp;posLang=en&amp;Core=Science">https://www.learnalberta.ca/ProgramsOfStudy.aspx?lang=en&amp;posLang=en&amp;Core=Science</a></p>

<b>Week 7 October 18</b>  In Class work – assignment submission	<b>Assignment 2 Due Wednesday, Oct 18<sup>th</sup> 2023 - 40%</b>
<b>Week 8 October 25</b>  In class work – assignment submission	<b>Assignment 3 Due Friday November 2<sup>nd</sup>, 2018 -20%</b>

### The Expectation of Excellence in Professional Work

Please review the Academic Calendar carefully. It describes the program and provides detailed schedules and important dates. It contains information on expectations for student work and professional conduct. In addition, procedures are described regarding concern about student performance in the program. Please pay especially careful attention to details and descriptions in the following topic areas:

- *The Importance of Attendance and Participation in Every Class*

As this is a professional program, experiences are designed with the expectation that all members will be fully involved in all classes and in all coursework experiences. As you are a member of a learning community your contribution is vital and highly valued, just as it will be when you take on the professional responsibilities of being a teacher. We expect that you will not be absent from class with the exception of documented instances of personal or family illness or for religious requirements.

- *Engagement in Class Discussion and Inquiry*

Another reason for the importance of attendance and participation in every class is that the course involves working with fellow students to share ideas and thinking. For example, each class you will work with a small group to engage fellow students in discussions on work being considered in class. You will also help other groups by providing ideas for scholarly inquiry in assignments. If you find that you are experiencing difficulties as a group collaborating, please inform the instructor.

### Expectations for Writing

All written assignments (including, to a lesser extent, written exam responses) will be assessed at least partly on writing skills. Writing skills include not only surface correctness (grammar, punctuation, sentence structure, etc.) but also general clarity and organization. Sources used in research papers must be properly documented. If you need help with your writing, you may use the writing support services in the Learning Commons. For further information, please refer to



the official online University of Calgary Calendar, Academic Regulations, E. Course Information, E.2: Writing Across the Curriculum: <http://www.ucalgary.ca/pubs/calendar/current/e-2.html>

### Late Submissions

All late submissions of assignments must be discussed with the instructor **prior to the due date**. Students may be required to provide written documentation of extenuating circumstances (e.g. statutory declaration, doctor's note, note from the University of Calgary Wellness Centre, obituary notice). A deferral of up to 30 days may be granted at the discretion of the Associate Dean of Undergraduate Programs prior to the end of the course with accompanying written evidence.

### Issues with Group Tasks

With respect to group work, if your group is having difficulty collaborating effectively, please contact the instructor immediately. If a group is unable to collaborate effectively or discuss course materials online in a timely manner, the instructor may re-assign members to different groups or assign individual work for completion.

### GRADING

Grade	GPA Value	%	Description per U of C Calendar
A+	4.0	95-100	Outstanding
A	4.0	90-94	Excellent – Superior performance showing comprehensive understanding of the subject matter
A-	3.7	85-89	
B+	3.3	80-84	
B	3.0	75-79	Good - clearly above average performance with knowledge of subject matter generally complete
B-	2.7	70-74	
C+	2.3	65-69	
C	2.0	60-64	Satisfactory - basic understanding of the subject matter
C-	1.7	55-59	
D+	1.3	52-54	Minimal pass - Marginal performance
D	1.0	50-51	
F	0.0	49 and lower	Fail - Unsatisfactory performance

Students in the B.Ed. program must have an overall GPA of 2.5 in the semester to continue in the program without repeating courses.

### Academic Accommodation

It is the student's responsibility to request academic accommodations according to the University policies and procedures listed below. The student accommodation policy can be found at: <https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Student-Accommodation-Policy.pdf>. Students needing an accommodation because of a disability or medical condition should communicate this need to Student Accessibility Services in accordance with the Procedure for Accommodations for Students with Disabilities: [ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Accommodation-for-Students-with-Disabilities-Procedure.pdf](https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Accommodation-for-Students-with-Disabilities-Procedure.pdf). Students needing an accommodation in relation to their coursework based on a Protected Ground other than Disability, should communicate this need, preferably in writing, to their Instructor.

### Academic Misconduct

For information on academic misconduct and its consequences, please see the University of Calgary Calendar at <http://www.ucalgary.ca/pubs/calendar/current/k.html>

### Attendance/ Prolonged Absence

Students may be asked to provide supporting documentation for an exemption/special request. This may include, but is not limited to, a prolonged absence from a course where participation is required, a missed course assessment, a deferred examination, or an appeal. Students are encouraged to submit documentation that will support their situation. Supporting documentation may be dependent on the reason noted in their personal statement/explanation provided to explain their situation. This could be medical certificate/documentation, references, police reports, invitation letter, third party letter of support or a statutory declaration etc. The decision to provide supporting documentation that best suits the situation is at the discretion of the student.

Falsification of any supporting documentation will be taken very seriously and may result in disciplinary action through the Academic Discipline regulations or the Student Non-Academic Misconduct policy.

<https://www.ucalgary.ca/pubs/calendar/current/n-1.html>

The Freedom of Information Protection of Privacy Act prevents instructors from placing assignments or examinations in a public place for pickup and prevents students from access to exams or assignments other than their own. Therefore, students and instructors may use one of the following options: return/collect assignments during class time or during instructors' office hours, students provide instructors with a self-addressed stamped envelope, or submit/return assignments as electronic files attached to private e-mail messages.

For additional resources including, but not limited to, those aimed at wellness and mental health, student success or to connect with the Student Ombuds Office, please visit <https://www.ucalgary.ca/registrar/registration/course-outlines>

Education Students Association (ESA) President for the academic year is Claire Gillis, [esa@ucalgary.ca](mailto:esa@ucalgary.ca).

Werklund SU Representative is Elsa Stokes, [educrep@su.ucalgary.ca](mailto:educrep@su.ucalgary.ca).