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EDUC 460.07 S01: Elementary Mathematics
Winter, 2024

Class Dates: MF, 8th January 2023-8th March 2024

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 Hours: By appointment only

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

COURSE DESCRIPTION:

The intent of the Specialization I Seminar is to introduce students to concepts, theory, and design planning related to teaching within the specialization of Elementary Mathematics. Theory as connected to an understanding of practical classroom experiences will particularly inform the course curriculum and will be explored through course readings, analysis of teaching/learning artifacts, and the design of discipline-based learning and assessment plans. Topics in teaching and learning will include teaching inclusively and addressing the needs of diverse learners, effective integration of technology, and discipline-based inquiry. Assignments will present the opportunity for students to develop an understanding of short-term instructional design and to begin to examine curriculum shifts in the province.

LEARNER OUTCOMES:

Over the course of the semester, students will:

- 1) Develop a foundational understanding of the nature of discourse in the discipline, as related to teaching and learning, including specialized language, concepts, and terminology;
- 2) Understand the idea of teacher as designer of learning and assessment plans, and use of the resources available for designing learning and assessment.
- 3) Explore and apply introductory theory related to the teaching of the discipline with an emphasis on designing discipline-based tasks and assessment processes and creating an adaptive classroom learning environment to better meet the needs of today's diverse learners.
- 4) Successfully design short-term learning and assessment plans to deepen understanding of key ideas/concepts within the discipline.

COURSE DESIGN AND DELIVERY:

This course will be delivered face-to-face on campus with supplementary engagement in a D2L environment.

REQUIRED RESOURCES:

Required readings will be made available through D2L.

ADDITIONAL RESOURCES:

Alberta Assessment Consortium (Username: [teachers](#) Password: [master](#))

Alberta Education. (2011). *English as a Second Language Proficiency Benchmarks*. Retrieved from:
<http://www.learnalberta.ca/content/eslapb/>

Alberta Education. (2019). *Numeracy*. Retrieved from: <https://education.alberta.ca/literacy-andnumeracy/numeracy>

Alberta Learning. (2010). *Making a difference: Meeting diverse learning needs with differentiated instruction*. Retrieved from: https://education.alberta.ca/media/384968/makingadifference_2010.pdf

Alberta Education. (2022). *Program of Study for Mathematics, K-6*. Available online at:
<https://curriculum.learnalberta.ca/curriculum/en>

Doucette Library – Library guide for lesson planning:
https://libguides.ucalgary.ca/guides/lesson_planning_resources

Friesen, S. (2009). *What did you do in school today? Teaching effectiveness: A framework and rubric*. Canadian Education Association. <https://www.galileo.org/cea-2009-wdydist-teaching.pdf>

Small, M. (2015). *Making math meaningful to Canadian students, K-8* (3rd Ed.). Toronto, ON: Nelson. Print copy available: Doucette Library Main collection 510.71 SMM 2016

Van de Walle, J.A., Karp, K.S., Bay-Williams, J.M., & McGarvey, L.M. (2017). *Elementary and middle school mathematics: Teaching developmentally*, 5th Canadian Ed. Toronto, ON: Pearson. Print copy available: Doucette Library Main collection 510.7 VaE 2018

ADDITIONAL INFORMATION:

Our class will be participating in a Global Classroom initiative that will involve collaboration with an international partner institution. As part of this experience, you will have the opportunity to learn from a leading international mathematics education researcher/teacher educator and engage in virtual learning activities with students at the partner institution.

LEARNING TASK	DESCRIPTION OF LEARNING TASK	GROUP / INDIVIDUAL	WEIGHT	DUE DATE
1	Analysis of a Learning Design and Assessment Plan	Group	30%	Friday 2 nd February, 2024
2	Expanding Mathematical Knowledge	Individual	30%	Mon 26 th February, 2024
3	Creation of Short-term Learning and Assessment Plan	Individual*	40%	Friday 8 th March, 2024

*For this assignment, students may work collaboratively but must submit individual assignments

WEEKLY COURSE SCHEDULE:

Date	Topic	Readings and Tasks	Due Dates
Week of Jan. 8-12, 2024	What is mathematics?	Alberta Education. (2022). <i>Program of Study for Mathematics, K-6</i> (see link under additional resources)	
Week of Jan 15-19, 2024	What constitutes the learning of mathematics? Lesson planning for mathematics from a learning perspective	TBA	
Week of Jan. 22-26, 2024	What constitutes the teaching of mathematics? Lesson planning for mathematics from a teaching perspective	TBA	
Week of Jan. 29-Feb 2, 2024	Mathematical understanding	TBA	Learning Task 1 Due Friday 2 nd February, 2024
Week of Feb 5-9, 2024	Mathematics and Social Justice/ Culturally-relevant pedagogy	TBA	
Week of Feb 12-16, 2024	English Language Learners and Mathematics	TBA	
Week of Feb 19-23, 2024	NO CLASSES—READING WEEK		
Week of Feb 26-Mar 1, 2024	Assessment	TBA	Learning Task 2 Due Monday 26 th February, 2024
Week of Mar 4-8, 2024	Assessment	TBA	Learning Task 3 Due Friday 8 th March 2024

CHANGES TO SCHEDULE:

Please note that changes to the schedule may occur to meet the emerging needs and dynamics of the participants in the course.

LEARNING TASKS AND ASSESSMENT

There are three required Learning Tasks for this course.

1. LEARNING TASK 1: Analysis of a Learning Design and Assessment Plan—DUE: Friday 26th January 2024

For this assignment, in groups, you will analyze a learning design and assessment plan (lesson plan) that you have found online. The purposes will be to foster professional learning conversations and build knowledge about the features of well-designed, discipline-based learning and assessment plans. You will provide a three-to-five-page (double-spaced, 12-point font) critical review of the chosen learning design and assessment plan.

CRITERIA FOR ASSESSMENT OF LEARNING TASK 1

	A+/A	A-/ B+	B / B-	C+ / lower
Assessment of Learning Plan -addresses the elements of a learning plan as listed in the assignment description	All elements of a learning plan are addressed in a thorough, detailed, and well-supported assessment.	Most elements of a learning plan are addressed in a thorough, detailed and well-supported assessment. Others require strengthening.	Some elements of a learning plan are addressed, however the assessment is vague and examples are inappropriate, unspecific or few.	Some of the elements of a learning plan are not addressed at all or are addressed in a cursory manner.
Grounding in theory -makes connections to theories of learning and Programs of Study. Explains these connections	Makes multiple connections to the literature, including the Program of Study. Theoretical positioning is highly effective, and well-explained. Shows evidence of reading well beyond the assigned course readings and the Alberta Program of Study.	Makes some connections to the literature, sometimes including the Program of Study. Theoretical positioning is usually effective, and well-explained. Some connections require strengthening. Shows evidence of some reading beyond the assigned course readings and the Alberta Program of Study.	Makes few connections to the literature or Program of Study. Theoretical positioning is sometimes inappropriate, and underexplained. Little evidence of reading beyond the assigned course readings and the Alberta Program of Study.	Connections to theory and/or Program of Study are missing, incomplete, or made in a cursory manner. No evidence of reading beyond the assigned course readings and the Alberta Program of Study.
Presentation of ideas -3-5 pages, double-spaced - academic writing style	Paper is 3-5 pages. Writing style is academic. In-text citations and reference list use correct APA 7 th edition style.	Paper is 3-5 pages. Writing style is primarily academic. Most in-text citations and reference list use	Paper is 3-5 pages. Writing style is sometimes academic, sometimes informal. Some in-text citations and reference list use	Paper exceeds 5 pages or is less than 3. Writing style is informal.

-APA in-text citations and reference list - attention to form (grammar, spelling, etc.)	Paper demonstrates superior attention to form.	correct APA 7 th edition style. Paper mostly demonstrates attention to form.	correct APA 7 th edition style. Paper requires attention to form.	In-text citations and reference list are missing or not in APA style. Paper requires extensive editing in order to attend to form.
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LEARNING TASK 2: *Expanding Mathematical Knowledge*—DUE: Monday 26th February, 2024

As a teacher of mathematics (even at the elementary school level) it is important to continually update and enhance one’s mathematical knowledge. An interesting way to keep abreast of developments in the field of mathematics, to better understand how mathematics is used in the world, and/or to situate one’s technical knowledge of mathematical topics in a historical/social context is to engage with contemporary mathematics media. In this task, you will choose one or more mathematics-based podcasts, listen to a series of episodes, and then reflect on your learning. Your reflection can take the form of a set of journal entries following each podcast episode, an academic essay, an audio report, or many other alternative forms of expression. If you have an idea for an alternative way of demonstrating your learning, please talk to me about it. Your reflection should include:

- a description of the overall focus of the podcast,
- a discussion of why you chose that particular podcast,
- a brief description of any episodes that you choose to discuss (so that I have a sense of the content to which you are referring),
- a description *and* analysis of what you learned, including what surprised or intrigued you, what you want to follow up on, what you didn’t understand/went over your head, what it all means to you, etc., and
- a description of how your learning might apply to your teaching of elementary/middle school mathematics topics.

When choosing the podcast, please ensure that the content/focus of the podcast is the discipline of *mathematics*—not topics in how to teach mathematics (though there are many good mathematics education podcasts out there), nor science-focused podcasts that contain reference to mathematics. A list of possible podcasts will be provided but you are not restricted to choosing from that list.

CRITERIA FOR ASSESSMENT OF LEARNING TASK 2

Learning Task 2 will be assessed on:

- the clarity of the description of the focus and aims of the podcast and why you chose it,
- the thoroughness of the description of relevant episodes, demonstrating that you engaged extensively with multiple episodes of the podcast,
- the depth of your description (the ‘what’) and analysis (the ‘so what?’/why does this matter?) of what you learned, and
- the thoughtfulness and creativity of your ideas for connection to your future teaching of mathematics.

3. LEARNING TASK 3: Creation of a Short-term Learning and Assessment Plan—DUE: **Friday 8th March, 2024**

For this assignment, you may work collaboratively but must submit individual assignments. You will design a short-term learning and assessment plan. The plan will be comprised of ONE lesson plan for an 80-minute class (for Secondary) or TWO lessons of 35- 40 minutes (for Elementary or Junior High). Your plan should follow a clear and comprehensive template and include a plan for learning and assessment that promotes deep understanding of a key concept or competency in your discipline.

Drawing on your Pragmatics and Field Experience courses in Semester I, in this final assignment you will be asked to prepare annotated lesson plans related to your teachable subject area. To this end you will be asked to record your thoughts and decision-making processes while creating the lesson plans. This may be done in a variety of ways and will be discussed in class by your instructor. Simply put, however, you will record on each lesson plan the reasons for the choices that you have made, how this lesson plan fits into the broader context of a unit as described in the Program(s) of Study, and the intended results of creating the lesson in the manner in which you have done.

The following elements are required:

1. A thorough lesson plan for the lesson(s) **on a lesson plan template that will be provided**, illustrating clearly your vision for the lesson(s) and making clear the comprehensive vision you have to achieve the objectives. Your plan must include (although is not limited to) the following: objectives, options for inclusion/differentiation, and formative assessment strategies that link to your objectives.
2. Annotations to the lesson plan. Record the choices you made, the ideas you chose to include, and how this lesson fits into the curricular objectives as stated in the Alberta Program of Study for Mathematics. Justify the pedagogical choices you have made by making reference to the literature discussed in class and your broader reading.

CRITERIA FOR ASSESSMENT OF LEARNING TASK 3

	A+/A	A-/ B+	B / B-	C+ / lower
DESIGN				
Lesson rationales	Rationales are clearly written and thoughtfully address the reasons why the chosen mathematics is important to study	Rationales are competently written but may address how the lesson is structured rather than lesson content; may lack depth of analysis of the import of the topic	Rationales are weak	Missing rationales for the lessons
Links to Program of Study (PoS)	Appropriate links to PoS for chosen level; Clear understanding of curricular outcomes as expressed in PoS.	Some links to PoS for chosen level are clear and appropriate; some PoS curricular outcomes	Links to PoS for chosen level not clear or appropriate; curricular outcomes present	Few if any links provided between PoS and lesson elements; curricular outcomes not present.

<p>Curricular outcomes match lesson activities</p> <p>Selected EAL benchmarks with rationale</p>	<p>Lesson activities appropriately address the target outcomes.</p> <p>Appropriate selected EAL benchmark objectives with specific rationale.</p>	<p>are represented in lesson plan.</p> <p>Most lesson activities address the target outcomes.</p> <p>Appropriate selected EAL benchmark objectives with general rationale.</p>	<p>but not clearly articulated.</p> <p>Some but not all lesson activities address the target outcomes.</p> <p>Selected EAL benchmark objectives not clearly articulated or rationale not articulated.</p>	<p>Lesson activities do not address the target outcomes in an effective manner.</p> <p>Inappropriate or missing EAL benchmark objectives.</p>
<p>INSTRUCTIONAL DELIVERY</p> <p>Plan demonstrates disciplinary knowledge</p> <p>Contains accurate mathematical content</p> <p>Plans for student engagement, learner-focused orientation</p> <p>Appropriate differentiation strategies</p> <p>Good organization</p>	<p>Plans well-informed by disciplinary knowledge.</p> <p>Content is mathematically accurate.</p> <p>Lessons are highly engaging and clearly learner-focused.</p> <p>Lessons contain research-based and appropriate strategies for differentiation.</p> <p>Lessons are clear and well-ordered; easy to envision how lessons will unfold; all important elements included; excellent links.</p>	<p>Good evidence of carryover of disciplinary knowledge to lesson plans.</p> <p>Most content is mathematically accurate.</p> <p>Lessons are somewhat engaging; mostly learner-focused.</p> <p>Lessons contain some strategies for differentiation.</p> <p>Lesson plans mostly clear with a logical flow; most important elements included.</p>	<p>Some evidence that disciplinary knowledge informed creation of lesson plans.</p> <p>Not all content is mathematically accurate.</p> <p>Lessons are somewhat learner-focused but need to be strengthened.</p> <p>Lessons may lack appropriate strategies for differentiation.</p> <p>Flow of lesson plans is neither clear nor logical and is hard to follow; several important elements of a good lesson plan are missing.</p>	<p>Little evidence that disciplinary knowledge informed creation of plans.</p> <p>Significant mathematical inaccuracies in the proposed content.</p> <p>Lessons are predominantly teacher-centred.</p> <p>Lessons lack attention to differentiation.</p> <p>Lesson plans are missing important elements and do not flow well (hard for reader to imagine how the lessons would unfold).</p>
<p>DEEP UNDERSTANDING</p>				

Learning opportunities for deep understanding of curriculum objectives	Lesson design is highly effective for encouraging deep understanding of content	Lesson design provides good opportunities to encourage deep understanding	Lesson design shows awareness of importance of encouraging deep understanding but is not effective in achieving conditions for such understanding.	Absence of evidence of attempt to encourage deep understanding
ASSESSMENT				
Integrated formative assessments	Appropriate assessments are clearly integrated into lessons; uses a variety of effective formative assessments to inform instructional decisions and to improve practice.	Good effort to integrate appropriate and effective assessments; may show little or no variety in choices for formative assessment.	Some attempt made to include appropriate assessment opportunities; shows lack of understanding of what constitutes effective assessment; formative assessment options are limited and not particularly effective.	Assessment lacking; no understanding shown of importance of appropriate and effective assessment; unclear vision of how to include assessment.
Statement of how assessment will improve practice	Strong statement of how assessments will improve practice.	Clear statement of how assessments will improve practice.	Discussion of importance of assessment or how it can be used to improve practice needs to be strengthened/ revised.	Does not address how assessment will lead to improved practice.
ANNOTATIONS				
Depth of analysis	Annotations display a sophisticated understanding and analysis of the role of planning in lesson design.	Annotations display a competent understanding of the role of planning in lesson design but may lack depth of analysis.	Annotations display some understanding of the role of planning in lesson design, but lack analysis.	Annotations display little understanding of the role of planning in lesson design and lack analysis.

WRITING QUALITY Writing quality	The annotated lesson plans are clearly written and free from errors.	The annotated lesson plans are relatively clearly written and contain few errors.	The annotated lesson plans are somewhat unclearly written and contain errors that impede understanding.	The annotated lesson plans are unclearly written and contain many errors that impede understanding.
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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 collaborating as a group, please inform the instructor.

EXPECTATIONS FOR WRITING

All written assignments 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 must be properly documented. All assignments are expected to be the original work of the student. 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/e2.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. A deferral of up to 30 days may be granted at the discretion of the Associate Dean of Undergraduate Programs 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-AccommodationPolicy.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.

Werklund SU Representative is Elsa Stokes, educrep@su.ucalgary.ca.