EDEL 520: Effective Instruction in Elementary School Mathematics
Professional Teacher Education Program in Elementary Education

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Course Description
EDEL 520: Elementary Mathematics Education Component. This initial licensure course enables prospective teachers to study practices, content, and issues related to mathematics in the elementary school classroom, including contemporary instructional strategies through model lessons and demonstrations, selected content, planning, resources, and evaluation. Furthermore, it requires an implementation during student teaching. Students learn to integrate mathematics with other disciplines, particularly social studies, science, and literacy, to frame math learning and teaching in contexts with which children can identify. Prospective teachers will apply Colorado Academic Standards for Mathematics in lessons they prepare and teach in keeping with the Performance Based Standards for Colorado Teachers.

Program Knowledge Base
The knowledge base of this course is centered on the collectively held belief that teachers engage in reflective thought and practice leading to the processes of rational problem solving and decision-making. The program adheres to the belief that teachers construct knowledge about learners, about content and processes, and about contexts that surround teaching and learning through reflection, reading, writing, discussion, and field-based experiences. The Elementary Education Department recognizes integration both within and across specific curricular areas in the elementary school. The knowledge base for this course is therefore consistent with the program of Elementary Education.

This mathematics education course focuses on increasing the prospective teacher’s level of pedagogical content knowledge. Classroom teachers make choices for optimizing pupils’ learning based on their professional knowledge of appropriate mathematics content, instructional strategies, and learners themselves. The course instructor uses modeling, direct instruction, demonstrations, and coaching, to provide experiences that promote problem solving, social participation in current instructional strategies, and professional reflection. Examples of mathematics integration with other areas give experience of mathematics in context in conjunction with appropriate mathematics content courses, prepares prospective teachers to implement instruction consistent with National Council for Accreditation of Teacher Education Program Standards for Elementary Teacher Preparation, Performance Based Standards for Colorado Teachers, Colorado Academic Standards for Mathematics, and standards promulgated by the National Council of Teachers of Mathematics and other professional organizations.
Sources providing a knowledge/research base for this component of EDEL 520 Course include such professional organizations and learned societies and their publications as the following: National Council of Teachers of Mathematics, School Science and Mathematics Association, University of Chicago School Mathematics Project, National Council for the Social Studies, International Reading Association, American Educational Research Association, Association for Supervision and Curriculum Development, National Society for the Study of Education, Eisenhower National Clearinghouse for Mathematics and Science Education, National Research Council, and Rethinking Schools. State curriculum and standards documents also inform this course.

National and State of Colorado Standards Met/Course Objectives
PBSCT – Performance-Based Standards for Colorado Teachers
InTaSC - Interstate Teacher Assessment and Support Consortium
NCATE – National Council for Accreditation of Teacher Education
NCTM – National Council of Teachers of Mathematics
ACEI - Association for Childhood Education International

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<th>Course Objective</th>
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<th>Readings and Assignments</th>
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<td>Prospective teachers will:</td>
<td>PBSCT/UNC</td>
<td>InTaSC</td>
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| Acquire competence in guiding the mathematical education of elementary school children in exploring mathematical concepts, per se, and through integrating mathematics with other areas. | 4, 5, 8 | 1.0, 2.3, 3.1 | | | •Class discussion  
•Lesson Plan and Presentation  
•Final Exam |
| Cultivate a systematic application of reflective decision making in promoting the mathematical education of elementary school students | 2.1–2.2; 3.1–3.8; 4.4; 5.1, 5.3, 5.5, 6.1, 7.1 | 1.0, 2.3, 3.5 | | | •Class discussion  
•Lesson Plan and Presentation  
•Improved Assessment  
•Reflective Paper  
•Final Exam |
| Value and act upon their understanding that mathematics is a dynamic discipline, important to every student's future, one in which all young people can participate as creative and successful learners and one which opens societal opportunities regardless of race, gender, religion, handicap, or national origin | 2, 5 | Equity Communication | 3.2, 3.4 | | •Class discussion  
•Textbook reading  
•Reflective Paper  
•Final Exam |
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<tr>
<th>Task</th>
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| Become familiar with mathematics learning and instruction in the    | 5.02.1 (a) – (e) | Number and operation, Algebra, Geometry,      | • Course reading responses  
| elementary school grades and across mathematical strands.          | 5.02.2           | Measurement, Data analysis & Probability      | • Class participation  
|                                                                    | 5.04.2           |                                               | • Lesson Plan and Presentation  
|                                                                    | 5.04.1/5.04.2    |                                               | • Textbook  
|                                                                    | 5.04.3/5.04.4    |                                               | • Improved Assessment  
|                                                                    | 4, 5, 8          |                                               | • Reflective Paper  
|                                                                    |                  |                                               | • Final Exam |
| Select developmentally appropriate practice, consistent with        | 5.06.01          | Communication                                  | • Textbook  
| Piagetian and constructivist theories, for elementary school        | 8.02.3(b)        |                                               | • Improved Assessment  
| mathematics teaching and learning.                                  | 1, 7, 8          |                                               | • Lesson Plan and Presentation  
|                                                                    |                  |                                               | • Final Exam |
| Become familiar with selected resources, including children's      | 5.04.1/5.04.2    |                                               | • Lesson Plan and Presentation |
| literature, for elementary school mathematics experiences and        | 5.04.3/5.04.4    |                                               |                                                                                               |
| encounters.                                                         | 2, 5             |                                               |                                                                                               |
| Understand the central role of problem solving in learning and     | 4                | Problem solving                                | • Class discussion  
| applying mathematics.                                               |                  |                                               | • Textbook  
|                                                                    |                  |                                               | • Lesson Plan and Presentation  
|                                                                    |                  |                                               | • Improved Assessment  
|                                                                    |                  |                                               | • Reflective Paper  
|                                                                    |                  |                                               | • Final Exam |
| Understand the concept of “drill and practice at the problem       | 4                | Problem solving                                | • Class discussion  
| solving level”.                                                      |                  |                                               | • Textbook  
|                                                                    |                  |                                               | • Final Exam |
| Understand “mathematics is a search for relationships that are not  | 4                | Reason & proof                                 | • Class discussion  
| obvious”.                                                           |                  |                                               | • Textbook |
| Analyze and skillfully apply a learning cycle approach to          | 5.03.4           |                                               | • Lesson Plan and Presentation  
| mathematics planning, instruction, and reflection.                 | 8.02.2(b)        |                                               | • Improved Assessment  
|                                                                    | 2, 7, 8, 9       |                                               | • Reflective Paper  
|                                                                    |                  |                                               | • Final Exam |
| Take equity and diversity into consideration when planning and      | 5.06.1/5.06.2    | Equity                                        | • Class discussion  
| implementing elementary school mathematics learning experiences.    | 5.06.5           |                                               | • Textbook  
|                                                                    | 8.02.2           |                                               | • Lesson Plan and Presentation  
|                                                                    | (a)              |                                               | • Improved Assessment  
|                                                                    | 1, 2, 7, 8       |                                               | • Reflective Paper  
|                                                                    |                  |                                               | • Final Exam |
| Augment or extend textbooks for elementary school mathematics       | 5.03.4           |                                               | • Class discussion  
| learning and teaching.                                              | 4, 7             |                                               | • Textbook  
|                                                                    |                  |                                               | • Lesson Plan and Presentation  
|                                                                    |                  |                                               | • Improved Assessment  
|                                                                    |                  |                                               | • Final Exam |
| Organize and implement mathematics learning                          | 5.05.2/5.05.3    |                                               | • Textbook  
|                                                                    | 4, 5, 6, 7, 8    |                                               | • Lesson Plan and Presentation  
|                                                                    |                  |                                               | • Improved Assessment  
|                                                                    |                  |                                               | • Final Exam |

1.0, 2.3, 3.1, 3.5
| Experiences for Peers and for Elementary School Students. | • Improved Assessment  
• Final Exam | |
| Develop Awareness of Roles for Technology, Including Calculators and Computers, in Teaching and Learning Elementary School Mathematics. | 5.07.1/5, 07.2  
5.07.3  
8.02.1(b) | 3, 10  
2.3 | • Class Discussion  
• Textbook  
• Lesson Plan and Presentation  
• Improved Assessment  
• Reflective Paper  
• Final Exam |
| Encounter Integration of Elementary School Mathematics with Other Areas and with People's Lives, So as to Craft Math Lessons in Contexts That Are Meaningful to All Children and Cultures. | 5.06.2/5  
06.3  
5.06.5  
9.02.2(d) | 2, 5  
Connection | 1.0, 2.3, 3.4, 3.5 | • Class Discussion  
• Textbook  
• Lesson Plan and Presentation  
• Final Exam |
| Assess as an Ongoing Informal and Formal Process to Inform, and to Improve Math Learning Experiences and Student Performance. | 5.03.3  
8.02.4(a)  
8.02.4(b) | 6, 7  
1.0, 2.3, 4.0, 5.1 | • Class Discussion  
• Lesson Plan and Presentation  
• Improved Assessment  
• Final Exam |

**Goals of the Course**

EDEL 520 prepares prospective teachers to develop an instructional knowledge base in the mathematics curriculum commonly taught to elementary school students in Colorado. This knowledge is used to integrate thinking skills, academic content, and democratic dispositions in ways that make learning mathematics a relevant and meaningful experience for all children. By making instruction comprehensible, increasing interaction among students, and teaching thinking and study skills, candidates will learn how to develop activities and plan lessons that meet the needs of all students at different states of development.

• Prospective teachers will acquire competence in guiding the mathematical education of elementary school children in exploring mathematical concepts, per se, and through integrating mathematics with other areas. (PBSCT 2.1, 2.2, 4.4; NCATE 2d, 2i)

• Prospective teachers will cultivate a systematic application of reflective decision making in promoting the mathematical education of elementary school students. (PBSCT 2.1-2.2, 3.1-3.8, 4.4, 5.1, 5.3, 5.5, 6.1, 7.1; NCATE 5b)

• Prospective teachers will value and act upon their understanding that mathematics is a dynamic discipline, important to every student's future, one in which all young people can participate as creative and successful learners and one which opens societal opportunities regardless of race, gender, religion, handicap, or national origin. (PBSCT 2.1-2.2, 3.1, 4.4, 6.1, 8.1-8.2, 9.1-9.3, 10.1, 10.4; NCATE 2a, 2d, 3b, 3d)
Course Requirements
1. **Course Materials**: Purchase the required text and read assigned reading **BEFORE** each class session. Bring your text to every class session. A basic calculator will be helpful to use in class.

2. **Class Attendance and Participation**: Adequate participation includes attending and being on time for all class sessions, completing and discussing all reading assignments, and participating in all class activities. **Each tardy and absence will result in the deduction of points.**

3. **Course Assignments**: Complete all course assignments and turn them in on time. **Assignments turned in late will result in the deduction of points.** The detailed course assignments list will be provided during the first class meeting.

Required Reading
Chapters 3, 4, and 5 should be read before attending the first night of class. Other required reading will be assigned the first night of class.

When thinking about course requirements, please be aware that there are five responsibilities that The University of Northern Colorado has established for students. Students have the responsibility to:

1. **Inquire about course requirements** if they do not understand them or are in doubt about them.
2. **Maintain the standards of academic performance** established for individual courses and for programs of study.
3. **Initiate an investigation** if they believe their academic rights have been violated.
4. **Learn the content** of any course of study.
5. **Act in accordance with commonly accepted standards of academic conduct.**

Grading Criteria
A (90-100% of points): A final grade of A means that the student has performed all in-class assignments and projects at an advanced level and/or exceptional level and has done so in a timely manner. He/she is always well prepared for class with notes about reading topics, contributes to discussions on a regular basis during whole class discussion and in small groups, and has missed no more than 1 session.

B (80-89% of points): A final grade of B means that the student has shown “good undergraduate level work” in his or her performance by being prepared to complete in-class assignments and discussions. He/she also has turned in required projects and assignments on time and met most of the grading criteria. He/she has not missed more than 2 sessions.

C (70-79% of points): A final grade of C means that the student has completed all or most course assignments and projects but has not always met criteria. A grade of C is assignment when a student (a) completes required projects and is sometimes prepared for class but often does not participate in class discussions; (b) turns in projects that are inadequate based on documented grading criteria; and/or (c) is absent from class more than twice.
F (less than 60% of points): A final grade of F means that the student has not satisfactorily completed the course assignments, completed required readings, or participated in class discussions. A grade of F is assigned when the student loses a significant amount of points (a) through excessive absenteeism, (b) by not coming to class prepared or (c) by not completing assigned projects.

**Policy on Incompletes:** An “I” is assigned due to unanticipated circumstances during the last week of the term that make the student unable to complete course requirements within the allotted time (e.g., he/she missed the final examination due to sickness or an emergency in the family). The instructor must submit to the school director a written notice of the specific coursework to be completed before the final grade is determined; a copy is kept in the school and one is provided to the student. To amend the grade of “I” with an earned grade on the student’s transcript, the student must complete all incomplete course work by the last day of the next semester. If the course requirements are not completed within the time limitation and the grade received in the Registrar’s Office, the grade will be recorded on the academic record as a failing or unsatisfactory grade.

**Policy on Plagiarism:** Plagiarism is the act of appropriating the written, artistic, or musical composition of another, or portions thereof; or the ideas, language, or symbols of same and passing them off as the product of one’s own mind. Plagiarism includes not only the exact duplication of another’s work but also the lifting of a substantial or essential portion thereof (UNC definition). Regarding written work in particular, direct quotations, statements which are a result of paraphrasing or summarizing the work of another, and other information which is not considered common knowledge must be cited or acknowledged, usually in the form of a footnote. Quotation marks or proper form of indentation shall be used to indicate all direct quotes. Regarding class projects, you are not to use as your entire presentation the completed works of faculty members, fully incorporated websites, or any other body of work in which you are not the author. Of course, with proper referencing, you can import portions of such works and websites to enhance and illustrate your presentation, and you can provide references to these other works for students who have an interest in pursuing a topic further.

**Policy on Originality of Products:** You are encouraged to build on your own previous work from other classes and programs, and to integrate material and ideas that you have learned in other classes into this class, with appropriate referencing. But projects from other classes are not to be duplicated and turned in to fulfill EDEL520 requirements, nor can you take work that you completed in another class and simply re-configure it, or enhance it, for this class. In other words, you are expected to do original work for each project and assignment that you complete in this class.

**Required Text**

**Recommended Texts**


**Selected Children’s Books Linking Mathematics and Literature**


**Recommended Websites**
Colorado Department of Education at http://www.cde.state.co.us
Kahn Academy at www.kahnacademy.org
National Council of Teachers of Mathematics (NCTM) at http://www.nctm.org
NCTM Illuminations at http://illuminations.nctm.org

**Accommodations Statement**
Students who believe that they may need accommodations in this class are encouraged to contact the Disability Support Services, voice/TTY (970) 351-2289, or fax (970) 351-4166, or visit www.unco.edu/dss as soon as possible to ensure that accommodations are implemented in a timely fashion.

**Inclusivity Statement**
The College of Education and Behavioral Sciences (CEBS) supports an inclusive learning environment where diversity and individual differences are understood, respected, appreciated, and recognized as a source of strength. We expect that students, faculty, administrators and staff within CEBS will respect differences and demonstrate diligence in understanding how other peoples’ perspectives, behaviors, and worldviews may be different from their own.