



**Course Name:** ECED 4475 Teaching and Learning Math and Science

**Semester Taught:** Fall 2020

**Credit Hours:** 4

**Course, Time and Place:** Bb/Online

**Instructor Information:**

|                                                            |                                                      |                                                                 |
|------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------------|
| <b>Instructor:</b><br>Catherine Martinez Berryhill,<br>PhD | <b>Communication Information:</b><br>cathyb@nnmc.edu | <b>Office Hours:</b><br>Email as needed or call<br>505-927-4137 |
|------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------------|

**Required Text:** Charlesworth, R. (2016). *Math and science for young children teaching* (8<sup>th</sup> ed.). Clifton Park, NY Cengage Learning.

[http://www.corestandards.org/wp-content/uploads/Math\\_Standards1.pdf](http://www.corestandards.org/wp-content/uploads/Math_Standards1.pdf)

<https://thewonderofscience.com/new-mexico-stem-ready-science-standards>

**E-mail Requirement:** All Students attending NNMC must use their NNMC e-mail account when communicating electronically about NNMC related business. If you are having trouble please contact IT at 505-747-2259.

**Attendance:** Attendance is required for all class sessions. . Since this is an online class, attendance will be measured in discussion posts to classmates and completing assignments on time. Education classes are competency-based, meaning that students must meet New Mexico State Competencies. Any absence during full term classes will require comparable make-up work at the discretion of the instructor. Number of Instructor/Student Hours: 4 credit hours equals 60 contact hours.

**Catalog Course Description:** The focus of this advanced curriculum is on the standards, principles and practices in teaching mathematics and science to young children in preschool through grade 3. An emphasis is placed on developing a content-rich integrated math and science curriculum that focuses on children’s development and interests including appropriate content, process, environment, and materials with special consideration given to problem-solving as the major method of constructing basic concepts. Field Experience Required. *Prerequisites: COE permission.* (4, 4T+0L).

**Course Objectives:**

1. Identify and develop an inventory of strategies needed for teaching math.
2. Identify and develop an inventory of strategies needed for teaching geometry.
3. Identify and develop an inventory of strategies needed for teaching measurement.
4. Identify and develop an inventory of strategies needed for teaching money concepts.
5. Identify and develop an inventory of strategies needed to teach the scientific method and promote self-discovery concepts.

**NM Teacher Competencies (InTASC), College of Education’s Conceptual Framework, and the NNMC Student Learning Outcomes.**

**New Mexico Entry Level Teacher Competencies (InTASC):** *On completion of this course, students will be able to demonstrate the mastery of the following competencies:*

H: Knowledge of Content: Early childhood teachers demonstrate content knowledge and knowledge of child development and learning both in terms of academic disciplines and interdisciplinary integration. Early childhood professionals demonstrate content knowledge including, but not limited to, the arts, literacy, mathematics, social studies, science, and technology. Early childhood teachers understand that children's initial experiences with these content areas form the foundation for later understanding and success. Thus early childhood teachers develop, implement, and value a content-rich, integrated curriculum that focuses on children's development and interests, using their language, home experiences,



**H.2.a.iv, H.2.b, H.2.c, H.2.c, H.2.d, H.2.e, H.3, H.3.a, H.3.b, H.3.c, H.3.d.**

I. Curriculum and Content Knowledge. **I.6, I.7, I.9, I.12, I.13, I.14.**

**COE's Conceptual Framework** - The Conceptual Framework of the College of Education at Northern New Mexico College represents the knowledge, skills and dispositions that all teacher candidates are expected to demonstrate during the program and as practicing teachers. The instruction in each class must reflect the Conceptual Framework in the course topics, assignments, discussions and readings.

Knowledge Principle-

1. Curriculum: the teacher candidate demonstrates knowledge of the content area and approved curriculum.
2. Instruction: the teacher candidate appropriately utilizes a variety of teaching methods and resources for each area taught.
4. Learning: the teacher candidate comprehends the principles of student growth, development and learning, and applies them appropriately.
5. Assessment: the teacher candidate effectively utilizes student assessment techniques and procedures.

**Skills-**

2. Utilization of Planning and Assessment tools

**Dispositions-**

2. A belief that all students can learn

**NNMC Student Learning Outcomes**

3. Demonstrate commitment to address cultural, social, and ethical responsibilities

**Assignment Descriptions/Assessment Alignment:**

| <b>Assignment/Assessment</b>                                                                                                                                                                                                                                                        | <b>NMPED Teacher Competencies</b>                                 | <b>Knowledge, Skill or Disposition</b> | <b>NNMC SLO</b> |               | <b>Point Value</b> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------|-----------------|---------------|--------------------|
| Chapter Readings and Reflections - Write a one-page, double-spaced reflection -APA format. When reading: a) read assignment with diligence; b) develop scholarly notes; and c) reflect on the text with a high level of thinking. Refer to Reflection Rubric at end of the syllabus | I.6, 7, 9, 12, 13, 14<br>Objectives 1                             | K1, 2, 4, 5<br>K2<br>D2                | 3               | 7 @ 10 points | 70                 |
| Develop an annual plan for science instruction at one grade level based on the NM Science Standards.                                                                                                                                                                                | I.6, 7, 9, 12, 13, 14<br>Objectives 1, 2, 3, 4, 5, 6              | K1, 2, 4, 5<br>K2<br>D2                | 3               | 1@20 points   | 20                 |
| Develop an annual plan for Math instruction at one grade level based on the NM Math Standards                                                                                                                                                                                       | I.6, 7, 9, 12, 13, 14<br>Objectives 1, 2, 3, 4, 5, 6              | K1, 2, 4, 5<br>K2<br>D2                | 3               | 1@20 points   | 20                 |
| Math Lesson Plan demonstration for one week aligned with appropriate math standards                                                                                                                                                                                                 | H.2. a. i, ii, iii, iv, H.2.b, c, d, e<br>Objectives, 1, 2, 3, 4, | K1, 2, 4, 5<br>K2<br>D2                | 3               | 1 at 20 pts   | 20                 |
| Science Lesson Plan demonstration for one week aligned with appropriate science standards                                                                                                                                                                                           | H.3.a, b, c, d,<br>Objectives 5                                   | K1, 2, 4, 5<br>K2<br>D2                | 3               | 1@20pts       | 20                 |



|                                                                                                            |                                                                                         |                         |        |              |            |
|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------|--------|--------------|------------|
| Math Kits for geometry, measurement and money                                                              | H.2. a. i, ii, iii, iv, H.2. b, c, d, e, H.3.a, b, c, d, I.6, 7, 9, 12, 13 Objectives 1 | K1, 2, 4, 5<br>K2<br>D2 | 3      | 3@ 20 points | 60         |
| Math and Science project demonstrations<br>On the discussion board<br>Plus a first introductory PowerPoint | H.2. a. i, ii, iii, iv, H.2. b, c, d, e, H.3.a, b, c, d, I.6, 7, 9, 12, 13 Objectives 1 | K1, 2, 4, 5<br>K2<br>D2 | 3      | 9@10 pts     | 90         |
| Final Reflection<br>Final Powerpoint                                                                       | H.2. a. i, ii, iii, iv, H.2. b, c, d, e, H.3.a, b, c, d, I.6, 7, 9, 12, 13 Objectives 1 | K1, 2, 4, 5<br>K2<br>D2 | 1 each | 2@30 pts     | 60         |
| <b>Total Points</b>                                                                                        |                                                                                         |                         |        |              | <b>360</b> |

**Course Dates, Topics, Assignments:**

| Date   | Topic/ Text Chapter                                                                                         | Assignment                                                                                |
|--------|-------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| WEEK 1 | Introduction, Syllabus, Class Policies and Procedures-Teaching Math and Science                             | Module 1<br>Introductory Powerpoint discussion<br>Self Assessment Reflection              |
| WEEK 2 | Concept Development, Constructivism, Six Steps Lesson Plan, Standards                                       | Module 2<br>Chapter Reading, Reflection, start work on Annual plan for Science Lessons    |
| WEEK 3 | Science, Engineering, Technology Inquiry Learning                                                           | Module 3<br>Chapter Reading, Discussion, Annual Plan for Science Lessons is due this week |
| WEEK 4 | PreK, 1 Concepts, Skills, Helping Children with Special Needs, Number Sense, Counting, Comparison Standards | Module 4<br>Chapter Reading, Reflection<br>Begin work on Annual plan for Math Lessons     |
| WEEK 5 | Science Engineering Standards, Spacial Sense and Concepts                                                   | Module 5<br>Chapter Reading, Discussion<br>Annual Plan for Math Lessons is due this week  |
| WEEK 6 | Measurement and Time, Measurement Standards, Data Graphing Standards                                        | Module 6<br>Chapter Reading, Reflection<br>Begin work on one week lesson plan for science |
| WEEK 7 | Integrating Curriculum, STEM/STEAM Standards, Language Literacy Standards                                   | Module 7<br>Chapter Reading, Discussion<br>One week lesson plan for Science is due        |
| WEEK 8 | Symbols and High-Level Concepts, Number Symbols and Concepts                                                | Module 8<br>Chapter Reading, Reflection                                                   |



|         |                                                                                                  |                                                                                                                                  |
|---------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
|         |                                                                                                  | Begin work on one week lesson plan for math                                                                                      |
| WEEK 9  | Mathematics Concepts/Operations for Primary Grades, Instructional Strategies                     | Module 9<br>Chapter Reading, discussion<br>One week lesson plan for math is due                                                  |
| WEEK 10 | Place Value, Geometry, Data Analysis, Measurement, Grades 1-3<br>Special emphasis on measurement | Module 10<br>Chapter Reading, Reflection<br>Begin work on Math kit planning for inclusion of measurement lessons across the year |
| WEEK 11 | Planning for inclusion of measurement across the year                                            | Module 11<br>Chapter Reading, Discussion<br>Math Kit planning for inclusion of measurement due                                   |
| WEEK 12 | Investigations in Primary Science<br>Planning for inclusion of geometry across the year          | Module 12<br>Chapter Reading, Reflection<br>Begin work on math kit planning for inclusion of geometry lessons across the year    |
| WEEK 13 | Earth and Space Sciences, Technology and Science Applications                                    | Module 13<br>Chapter Reading, Discussion<br>Math kit for geometry due                                                            |
| WEEK 14 | Science Lesson Plan Presentations                                                                | Module 14<br>Chapter Reading. Reflection,<br>Math kit for money due                                                              |
| WEEK 15 | Best Early Childhood Math and Science Teaching and Learning Strategies                           | Module 15<br>Chapter Reading. Final Reflection assigned.<br>PowerPoint assigned.                                                 |
| WEEK 16 | Ppt presentation on meeting class goals                                                          | Module 16<br>Power Point due on discussion board<br>Final Reflections due                                                        |

**Grading: based on percentage of final points accumulated during semester**

|             |           |            |
|-------------|-----------|------------|
| A+ 100 - 97 | A 96 - 93 | A- 92 - 90 |
| B+ 89 - 87  | B 86 - 83 | B- 82 - 80 |
| C+ 79 - 77  | C 76 - 73 | C- 72 - 70 |
| D+ 69 - 67  | D 66 - 63 | D- 62 - 60 |
| F 59 - 0    |           |            |

**Late Work:** Your work is due on the date indicated on the syllabus. Any exceptions are at the discretion of the professor and must be agreed to in advance.

**Students with Disabilities:** Northern New Mexico College recognizes its responsibility for creating an institutional climate in which students with disabilities can succeed. In accordance with Section 504 of the Rehabilitation Act and the Americans with Disabilities Act; if you have a documented disability, you may request accommodations to obtain equal access and to promote your learning in this class. Please contact Verna Trujillo, Coordinator of Accessibility and Resource Center at 505-7472152 or [v.trujillo@nmmc.edu](mailto:v.trujillo@nmmc.edu) to inquire about appropriate accommodations. After your eligibility is determined, you will be given a letter, which when presented to instructors, will help us know best how to assist you.

**NNMC Incomplete Policy:** The grade of 'I' is given for course work that could not be completed due to circumstances beyond the student's control. This means a serious illness or accident, not poor planning. If



a significant crisis prevents your timely completion of the

requirements of this course, please make an appointment with your instructor. Once an Incomplete is given, it is the STUDENT’S responsibility to complete the work according to the parameters of the deadline. If you do not complete your work, the ‘I’ automatically becomes an ‘F’ when the deadline passes.

**Academic Ethics:** Dishonesty in connection with tests, quizzes, or coursework assignments may be cause for dismissal from the College. Plagiarism is the most common type of academic dishonesty. Plagiarism consists of any representation of another person’s work as one’s own without proper acknowledgment. Examples include but are limited to 1) submitting as one’s work a paper which includes a part copied from a book or article without identifying the quote selection and/or sources, 2) presenting an author’s ideas as though they were your own original ideas, or 3) using work by another student with your name as the author. When an instructor suspects a student of academic dishonesty, the instructor will bring it to the student’s attention. If the problem is not resolved to the instructor’s satisfaction, the incident will be reported to the Dean for follow-up action. Students are responsible for referring to the Student Handbook for specific policies and procedures.

### Rubric for Reflection Papers

Reflection papers for this class are 2 pages in length, 12 pt font, APA style margins and citations.

Reflections are based on readings, resources, standards and your own observations.

Reflections are based on prompts given by the professor. There are at least 4 prompts given, requiring at least ½ page for each prompt.

| Criteria                                 | No Points                                                                      | Half Points                                                          | Full Points                                                   |
|------------------------------------------|--------------------------------------------------------------------------------|----------------------------------------------------------------------|---------------------------------------------------------------|
| <b>Integration of reflection prompts</b> | The reflection does not address the prompts                                    | The reflection addresses only half of the prompts                    | The reflection addresses all the prompts                      |
| <b>Grammar</b>                           | There are more than four errors in grammar, spelling and sentence construction | There are four errors in grammar, spelling and sentence construction | Grammar, spelling, and sentence construction are correct      |
| <b>Citations</b>                         | There are no citations in the writing                                          | There is at least one citation, and there is an error                | There are at least two citations, and the citation is perfect |



Rubric for Discussion Board

Discussion Boards happen every other week. Discussions are meant to help build community within the class. Please answer as many of your classmates, knowing that you are on the board to speak to their prompt and to encourage growth.

| Criteria                                    | Half Points                                                                          | Full Points                                                                             |
|---------------------------------------------|--------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| Post and response                           | Only a post from a student is on the discussion board                                | A post and at least two responses are on the discussion board                           |
| Attention to the professor initiated prompt | There is a student post, but it does not address the prompt                          | The student post and response address the prompt                                        |
| Length of the post                          | The initial student post is not sufficiently long enough to discuss the prompt fully | The student post and responses are sufficiently long enough to discuss the prompt fully |

