EDUC 661-621 Mathematics: Curriculum, Instruction, and Assessment

Frostburg State University
Educational Professions
Fall 2020

Course: ELED 661 Mathematics Curriculum, Instruction, and Assessment 3 credits

Instructor: Mrs. Bonnie Robinson
Office Hours: Wed. 4:30-5:00 pm
Yellow Springs Elementary
appointment

Office Hours: Others by bjrobinson@frostburg.edu


Course Description: Current theory and practice for mathematics instruction in elementary education. Review of research on children’s developing conceptions and misconceptions about mathematics, children’s problems in achieving literacy in another symbol system, children’s error patterns, and principles of learning in elementary mathematics. Study of Maryland Outcomes and National Standards for Mathematics. Prerequisite: Admission into the Master of Arts Teaching program or permission of the program coordinator.
Course Purpose: The purpose of this course is to relate mathematical concepts and reasoning with best practices and theories of learning. Through this course candidates will become instructional leaders by relating their knowledge of the curriculum to their instruction of lessons in number sense and systems, geometry, measurement, statistics and probability, and algebra. These candidates will be reflective decision-makers and continuous assessors to ensure students understand mathematics when problem-solving real-life situations and managing the results.

Course Evaluation:

1. **Test 1**: Contains questions on topics from class presentation and the text (100 points)
2. **Test 2**: Contains questions on material covered after Test 1 (100 points)
3. **Lesson Plan**: a math lesson and reflection to be announced (52 points)
4. **Math Autobiography**: A history of your experience with math (10 points)
5. **Parent Night Presentation**: presentation on a computational strategy other than U.S. Standard Algorithm (30 points)
6. **Reading**: a journal article summary and reflection (10 points)
7. **MCAP Assessment Exploration** (20 points)
8. **Math Case Study**: analysis, assessment, and intervention of student work (30 points)
9. **Roundtable**: sharing of technology and literature resources in math (20 points)
10. **Field Experience Guide assignments**: Assignments to be completed at the candidate’s school (5 points each/ 25 points)
11. **Math Resource Game Collection**: collection of math games aligned to the Common Core (6 points each/ 30 points)
12. **Participation**: attendance and participation in class (3 pts/class)

Course Outcomes and Assessments:

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<th>OUTCOMES</th>
<th>ASSESSMENTS</th>
<th>CONCEPTUAL</th>
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<tr>
<td>Candidates will be able to:</td>
<td>Candidates will be measured by: <strong>FRAMEWORK</strong></td>
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**KNOWLEDGE**

1. Have knowledge of the structures of math curriculum and how the NCTM Standards and the Maryland outcomes relate to that structure.
   - A presentation of curriculum and standards for a hypothetical Parent Presentation [DP # 2]
   - A parent communication system to help parents be involved [CBB # 5]

2. Understand research on children’s approaches in learning and reasoning in mathematics and best practices in teaching.
   - An exam on concept development [IL #5]
   - Journal Reading

3. An awareness of student error patterns and mathematical misconceptions in the process of developing mathematical reasoning.
   - A case study with recommendations to improve student learning [CA #2]

4. Have knowledge of research into instructional strategies in teaching mathematics
   - Lesson Plan – appropriate to county curriculum’s scope and sequence [IL #5]

5. Have knowledge of research on equity issues and bias in the teaching and attitudes toward mathematics of various groups of students.
   - Lesson Plan indicate awareness and highlight accommodations [IL #5 & 6]

6. Understand the importance of making mathematics meaningful for students through problem solving and connecting knowledge to everyday life.
   - Lesson Plan [IL #6 & 8]

**SKILLS**
7. Demonstrate use of manipulatives in order to foster understanding of a given mathematical concept.
   - A lesson plan using manipulatives to address a mathematical concept and reflection on that lesson. IL #5 & 6

8. Analyze reading materials to engage students in mathematical concepts.
   - Class discussion
   - Lesson plan using literature IL #5 and 7

9. Demonstrate appropriate technological links with the mathematics curriculum in the PDS placement.
   - Lesson plan using technology
   - MCAP Practice Test
   - Technology Roundtable IL #9

10. Use the four-stage teaching strategy to allow children to develop concepts.
    - Lesson plan IL #5

    - Class discussion and Case Study IL #8

12. Evaluate and adapt instruction and assignments for students with special needs
    - Adapt each lesson plan for students with special needs (according to known learners from past field experiences). IL #5

DISPOSITIONS

13. Foster student creativity in solving mathematical problems.
    - Incorporated in case study and lesson plan IL #6 & 8
14. Respect the learning styles and developmental levels of the students.
   · Incorporate varied learning styles and adaptations into planning, instructing, and assessing lessons.

15. Promote an appreciation of mathematics as a functional tool for life.
   · Demonstrate links in lessons to the importance of mathematics as a life skill.

16. Support parent involvement in the mathematics program.
   · Field Experience Guide Assignment
     · Parent Night presentation

COURSE POLICIES ELED 661
Fall 2020

Course Grades:

A = 93-100% Outstanding achievement; for only the highest accomplishment
B = 83-92% Praiseworthy performance; above average
C = 73-82% Average; for satisfactory performance
D = 63-72% Below average achievement
F = Below 63% Very unsatisfactory performance

Academic Dishonesty: The University considers academic dishonesty to be impermissible and subject to disciplinary actions.

“Academic dishonesty is defined to include any form of cheating and/or plagiarism. Cheating includes, but is not limited to, such acts as stealing or altering testing instruments falsifying the identity of persons for any academic purposes; offering, giving, or relieving unauthorized assistance on an examination, quiz, nor other
written or oral record. Plagiarism is the presentation of written or oral material in a manner which conceals the true source of documentary material; or the representation of material which uses hypotheses, conclusions, evidence, data, or the like in a way that the students appears to have done work which he/she did not, in fact do.” (The Pathfinder, Frostburg State University)

Disruptive Student Behavior: “The University will not tolerate disorderly or disruptive conduct which substantially threatens, harms, or interferers with University personnel, orderly processes, and functions. A faculty member may require a student to leave the classroom when his/her behavior disrupts the learning environment. A student found responsible for disruptive behavior may be administratively withdrawn from the course.” (Student Code of Conduct)

While a peer or instructor is presenting, candidates will be expected to focus on that presenter without discussion to other members of the class. Candidates engaged in extensive talking or other behavior that is disruptive to the learning environment will be asked to leave. If you are asked to leave, it will be treated the same as an absence.

Disability: If a student has a disability, one that may require special consideration by the instructor, and has been confirmed by the Office of Student Services, he/she should provide information in writing to the instructor that includes suggestions for assistance in participating in and completing class assignments. This should be accomplished no later than the end of the second week of class.

Attendance/Punctuality: Students are expected to attend each class session and come prepared to participate. If a student must be absent from class, he/she is responsible to communicate with the instructor either prior to or immediately following the absence. More than ONE unexcused absence will result in the lowering of a student’s grade. After one missed day, a percentage deduction will be calculated from your FINAL grade. There will be a 5% deduction for the second missed day, a 10% deduction for the third missed day, a 15% deduction for the fourth missed day, and a 20% deduction for the fifth missed day. Six or more absences will result in automatic failure in the course. For every two (2) times that a student is late to class, or leaves class early, he/she will receive one unexcused absence. A written appeal with appropriate documentation (a note from a doctor, preferably not Urgent Care) can be submitted to reverse the point deduction. All appeals must be written and submitted to the instructor within one week of the absence.

Attendance will be taken at the start of each class session.
Professional Behavior: Teacher candidates are expected to demonstrate dispositions of professional educators. They must be dependable in matters such as attendance, punctuality, and responsibility. They must demonstrate attitudes and behaviors consistent with professional conduct and reflect a seriousness of intent in learning to teach. Teacher candidates are held accountable for their actions and are expected to be respectful of all individuals.

Late Assignments: All assignments and projects are due on the date scheduled at the beginning of class. If an assignment is late, the student’s grade for the assignments will be lowered one full letter grade for each day it is late.

Technology Usage: Cell phone usage and/or text messaging is prohibited during class sessions, unless the device is being used as a learning tool. All cell phones should be turned off or on vibrate during class meetings. Exceptions will be made only when concerning family or medical emergencies and the need for these exceptions should be communicated to the instructor prior to the start of the class session. Leaving the classroom during instructional time to answer a cell phone (if not previously discussed with the course instructor) will be considered an absence from class. Students texting during class will be given a verbal warning; additional texting after this warning will result in the student being asked to leave the classroom. If a student is asked to leave the classroom due to inappropriate technology usage, this will be considered as an unexcused absence.

Laptop computers/tablets may be used for note-taking during class sessions if permission has been granted by the instructor in advance. The use of laptops/tablets for other purposes is not permitted during class. Inappropriate use of laptops/tablets during instruction will result in a verbal warning. Continued use after this warning will result in the student being asked to leave the classroom, resulting in an unexcused absence.

Your health and safety are important. Therefore, during every physical in-person meeting of this course, everyone is required to follow state, local, and University public health mandates as outlined in the FSU Social Compact. Everyone must wear a face mask that covers their nose and mouth, respect posted signage, and practice good social distancing by remaining at least 6 feet away from others. The Code of Student Conduct notes that following these health and safety protocols constitute complying “with a reasonable request from authorized University personnel in the performance of their official duties,” and failing to do so is a Code of Student Conduct violation. Students who do not comply with these mandates will be asked to leave class. Students who refuse to leave will be
referred to the Dean of Students and may be administratively removed from the class if found to be responsible for Code of Conduct violations.

Resources:

www.corestandards.org (Links to an external site.)
www.nctm.org (Links to an external site.)
www.youcubed.org (Links to an external site.)
https://gfletchy.com/ (Links to an external site.)
https://support.mdassessments.com/ (Links to an external site.)

Cathcart, W. George, and Nadine Bezuk, Yvonne, Pothier, & James Vance (2011).
   Learning Mathematics in Elementary and Middle Schools: A Learner-Centered Approach

What is expected of you:

- Arrive on time
- Come prepared with materials ready
- Have your reading done before class
- Turn in assignments on time and in the correct place
- Ask questions of the instructor
- Interact with your peers in a positive manner
- Actively engage in class activities and discussions

Course Assignments

- Math Autobiography - 10 points (Submit on Canvas)
This is a typed one-page paper describing your history with math. Your history of math should be described thoroughly and completely with specific examples. The paper should have no mistakes in grammar, punctuation, spelling or capitalization.

Journal Reading - 10 points (submit on Canvas)
Summarize and react to an article that deals with mathematics in elementary school. The summary and reaction should be typed and not exceed a total of two pages. Your reaction can be what you learned, a new idea presented, questions you have, confirmation of what you knew, or an "aha" moment. A copy of the article must accompany the written report. You can search the internet (Google Scholar and Research Port are excellent search engines or you can search hard copies of journals (eg.: Teaching Children Mathematics, Instructor, Childhood Education, The Elementary School Journal, Educational Leadership, Exceptional Children, etc.)

Roundtable: Technology/Literature/Connections - 20 points
- Create a list of 20 math online resources:
  10 Teacher Websites (lesson ideas, content/standards knowledge, videos of model lessons)
  10 Student Websites/Apps (concept instruction, problem-solving, modeling, etc.)
- Share a problem-solving lesson seed using children's literature. Summarize the book and explain which CCSS it can be used to support. Choose a book that either deals directly with a math concept or a story that can be used as a theme for generating problems. The problems should not be rote counting; the problems should involve higher-order thinking. When you share in class if at all possible you will display the book.
- Class Presentation - show the class how to use one student app and share your children's literature lesson seed.

Parent Night Presentation - 30 points
You will prepare a parent night presentation on a computation strategy (other than the U.S. Standard Algorithm) using Google slides or Screencastify. You will present to the class. The purpose of the presentation is to acquaint parents with alternative strategies based on place value and properties of operation so they may support their child at home. If you are using Google Slides you must include a script of what you will say during the presentation in the notes section for each slide. If you choose Screencastify it is expected you are recording your narration while modeling the strategy on
Create a short assessment that will be given to the class after your presentation to assess the effectiveness of the presentation.

**MCAP Assessment Exploration - 20 points (Submit on Canvas)**

https://support.mdassessments.com/ (Links to an external site.)

Type your answers for questions for practice tests for Grade 3 and Grade 5, units 1 and 2 and submit on Canvas. Also, include a one-page reaction to the tests. Your reaction may include but is not limited to what you notice about the tests, what surprised you, how the tests are similar/different, what skills students need other than math skills to be successful, what you would do as a classroom teacher to prepare your students for success.

**Lesson plan - 52 points - Paper copy of draft turned in during class or emailed to instructor. Final copy submitted on Taskstream)**

Identify the grade level, topic, behavioral objectives, standards, materials needed, introductory activity, procedures, closure, evaluation method, and reflection. All students will submit a first draft and a final draft. The first draft needs to be submitted via an email attachment prior to teaching the lesson in your assigned school. The final draft must be submitted in Taskstream.

**Math Games Kit – 30 points (submit on Canvas)**

This is a collection of 5 math games (one for each common core domain). The standard needs to be referenced in the directions. You will be assigned a grade level for each domain. You need to have directions and materials for each game. You will be teaching the game colleagues in our class and possibly in your school assignment. These will be due throughout the semester.

**Field Experience Guide Assignments - 25 points (Hand in during class)**

Assignments from Field Experience Guide will be assigned throughout the semester.

**Case Study - 30 points (submit on Canvas)**

Candidates will select a student to complete an in-depth math review via a case study format. The study will require the candidate to complete the following:

- Correctly analyze the problem
- Develop an appropriate plan
Assess the results

The candidate will also need to show evidence of the procedural steps. **Student artifacts** need to be included with name removed and anecdotal entries (virtual evidence could be videos, screencasts, etc.) This will help you document step #2 of procedures. In addition, the final product must be grammatically correct and consist of well-developed paragraphs. A detailed rubric will be posted on Canvas for scoring the Math Case Study along with the procedures listed here.

**Case Study Procedures:**

1. After assessing the students, focus on a student having difficulty with mathematics concepts taught.
2. Analyze the student’s work to find any patterns of misconception. (**Artifact needed**)
3. Determine developmental implications that might be affecting success.
4. Decide how you can use **another strategy** or **multiple strategies** to help that student understand the concept.
5. Implement the strategy with the student. (**Artifacts needed** to show implementation of strategy.)
6. Assess the results. (**Final artifact needed**)

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<tr>
<th>Date</th>
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<th>Topics and Chapters (chapter numbers)</th>
<th>Assignments Due</th>
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<tr>
<td>8/19</td>
<td>USMH Room 124/125</td>
<td>• Introduction&lt;br&gt;• Teaching Mathematics in the 21st Century (1)&lt;br&gt;• Exploring What it Means to Know and Do Math (2)</td>
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<td>8/26</td>
<td>USMH Room 124/125</td>
<td>• Teaching through Problem Solving (3)&lt;br&gt;• Planning in the Problem-Based Classroom (4)&lt;br&gt;• Building Assessment into Instruction (5)</td>
<td>*Math Autobiography</td>
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9/2 Online
- Using Technological Tools to Teach Mathematics (7)
- Developing Early Number Concepts and Number Sense (8)
- Develop Whole-Number Place-Value Concepts (11)

9/9 Online
- Developing Meaning for the Operations (9)
- Developing Strategies for Addition and Subtraction (12)
- Review for Test 1

9/16 USMH Room 124/125
- Helping Students Master the Basic Facts (10)
- Developing Strategies for Multiplication and Division Computation (13)

9/23 Online
- Developing Fraction Concepts (15)
- Developing Strategies for Fraction Computation (16)
- Test 1

9/30 USMH Room 124/125
- Developing Measurement Concepts (19)
- Geometric Thinking and Geometric Concepts (20)
10/7 Online  
- Developing Concepts of Decimals and Percents (17)  
  *Parent Presentation

10/14 No class  
  *Lesson Plan

10/21 No Class

10/28 No Class

11/4 No Class  
  *Math Game MD

11/11 USMH Room 124/125  
- Algebraic Thinking: Generalizations, Patterns, and Functions (14)  
  - Review for Test 2  
  *Case Study  
  *Field Guide Assignments

11/18 Online  
- Test 2  
  *MCAP Exploration

*Concepts subject to change based upon needs of students.