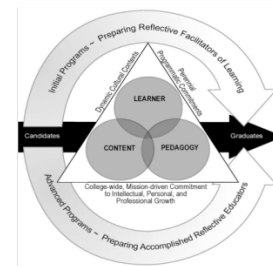




# BUFFALO STATE

The State University of New York



## MED 683 Problem Solving and Problem Posing (3 credits)

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Office Hours: by appointment

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### Major Objectives of the Course

The major focus of this course is to develop knowledge of problem solving and problem posing as a tool for teaching and learning mathematics. While problem solving and posing has long held a central place in mathematics education literature, its role in the classroom has been far more limited. The course activities and assignments are intended to broaden your perspective and teaching practices as well as deepen our own knowledge of problem solving, of the role of problem solving and posing in learning, and of mathematical content. Specifically, you will:

- A. understand the central role of problem posing as an integral component of cognitively demanding mathematical tasks and related lesson components;
- B. document the multiple roles of problem solving and problem posing in the teaching and learning of mathematics;
- C. deepen content knowledge through exploration of the Phillips Exeter math curriculum and other problem-based curricula;
- D. create problems and contexts to engage all students through a low-floor – high-ceiling approach that builds on knowledge of a concrete-pictorial-abstract framework;
- E. trace the historical path of problem solving and posing and its centrality within significant artifacts in mathematics education.

### Attendance:

You are expected to attend every session and be prepared to engage with your peers on the assigned topics. Your active involvement individually and with the entire class is an important way to help meet the course objectives. For you to be involved you must be present. Less than perfect attendance may affect your participation grade as described below.

### Grading Policy:

Final grades will be calculated based upon the following criteria:  
(See descriptions below)

Assignments	50%
Presentations	30%
Lesson Tasks	10%
In-class Participation	<u>10%</u>
	100%

## **Assignments**

Assignments will be posted at <http://math.buffalostate.edu/~wilsondc/MED683/index.html>

These will be an integral part of your learning experience in this course and will be graded using the rubric below. *All written assignments should be double-spaced and in a 12-point font and adhere to APA guidelines for purposes of citing sources and documenting references.*

Assignments are graded using the rubric scale of 1 to 4 described below. Please submit MS Word files via email on the date they are due. If you use Google Docs or OneDrive, you are able to download your file in Word format, so please do so and email the file.

Late Submissions: Unless otherwise stated, assignments are due at the start of class following the date they are issued. If you have a problem submitting an assignment on time, discuss it with me as soon as possible. Any work that is not completed on time will suffer a reduction in grade that will vary according to the degree of tardiness. I will not be able to accept an assignment more than 1 week late. In the event of a class absence, assignments should be faxed, e-mailed or placed in my mailbox to avoid a reduction in grade.

### **Written Assignment Grading Rubric (0 – 4)**

4: (A) Demonstrates broad and deep understanding of issues, practices, generalizations, and concepts specific to the task or situation with an emphasis on teaching and learning implications. Critique, reflection, and self-assessment are well-founded with examples from course content; readings in research, theory, and practice; and personal experience (if applicable). Demonstrates personal growth. Spelling, grammar, format, or organization of the work does not detract from the reading and understanding the paper. APA guidelines followed.

3: (A-/ B+) Demonstrates a complete and accurate understanding of issues, practices, generalizations, and concepts specific to the task or situation. Implications for teaching and learning are adequate. Critique, reflection, and self-assessment have some foundation in the course, readings, and experience. Some evidence of personal growth. Spelling, grammar, format, or organization of the work detracts very little from the reading and understanding the paper. APA guidelines followed for the most part.

2: (B/B-) Displays an incomplete understanding of the issues, practices, generalizations, and concepts specific to the task or situation and/or has notable misconceptions or an incomplete response. Little discussion of teaching and learning implications and re-presents course content or ideas from readings. Little critique and reflection is evident; has little foundation in the course, readings, and experiences. AND/OR Spelling, grammar, format, or organization of the work detract from the reading and understanding the paper. APA guidelines not generally followed.

1: (C/D) Demonstrates misconceptions about the issues, practices, generalizations specific to the task or situation or omits significant parts of the question and response. The teaching and learning process and reflection and/or critique are not evident. AND/OR Spelling, grammar, format, or organization of the work detract a great deal from the reading and understanding the paper. APA guidelines are not followed.

### **Mathematical Content Assignment Grading Rubric (0 – 4)**

**4:** Solutions include a complete, error-free work and/or justification along with diagrams where appropriate including coordinate graphs (on graph paper if directed in the text). Solution shows understanding of the question's mathematical purpose and ideas and includes response to all parts of the question. May include examples and counterexamples where appropriate.

**3:** Solutions are good solid responses but not error-free and/or explanation is less complete. Supporting work may lack some of the above elements or parts of the question may have been omitted and/or misunderstood. Conclusions may not be fully supported.

**2:** Submission contains incomplete responses, multiple errors and/ or the explanation may be muddled. Lacks diagrams or includes diagrams that are unclear or inappropriate. Indicates some understanding of mathematical ideas but they are not expressed clearly. Discussion incomplete.

**1:** Omits significant parts of the questions and/or has major errors. May use inappropriate strategies or fail to document solution paths with diagrams, work, and/or supporting discussion.

### **Presentations**

You will make several presentations during the course. Unless otherwise stated it is expected that all presentations will be done in Powerpoint, Prezi or Keynote and supplemented with appropriate handouts.

### **Problem Solving/Problem Posing Lesson Tasks**

Our coursework will provide numerous opportunities to consider classroom events and best practices for engaging our students in problem posing and problem solving. Further details on this will be provided during class sessions.

### **Academic Integrity:**

*Students are responsible for the honest completion and representation of their work, for the appropriate citation of sources, and for respect for others' academic endeavors. By placing their name on academic work, students certify the originality of all work not otherwise identified by appropriate acknowledgments. No credit shall be awarded in situations where it has been determined that this policy has not been followed\*. See the Academic Policies section of the Buffalo State Graduate Catalog for details.*

*\*Adapted from the University of Wisconsin's *Student Disciplinary Guidelines*.*

### **Statement on Students with Disabilities:**

If you have a diagnosed physical disability, learning disability, or psychological disability which will make it difficult for you to carry out the course work outlined above or which requires accommodations such as assistance from note takers and/or readers, extended time on assignments, and so on, please advise me during the first week of the course and contact the Office of Special Services for Students with Disabilities (878-4500) to discuss possible arrangements for reasonable accommodations.

### **Classroom Etiquette:**

Please silence completely (no vibration) all cell phones so as not to interrupt the environment in the classroom- no calls, no texts, no email, etc. Let me know at the start of class if there is a special circumstance that does not allow you to comply with this policy.

### **Video/Audio Recording:**

You may take photos in class as desired.

You ***do not*** have permission to video or audio record at any time during class sessions whether e-meeting or physically in a classroom.