

**University of Maine at Farmington**  
**Office of Graduate Studies**

**Course:** EMA 500: Number, Operations, Algebra, and Functions PK - 12

**Where/When:** On [Zoom](#) -

Saturday, September 14; 9:00 am - noon

Saturday, October 26; 9:00 am – noon

UMF Education Center 103 - Saturday, December 14; 9:00 am – 3:00 pm

All other time is online asynchronous

**Instructor:** Dr. Daniel Jackson, Education Center, Office 204

778-7318; [daniel.jackson1@maine.edu](mailto:daniel.jackson1@maine.edu) <<---- Best way to reach me

**Office Hours:** Fridays 2:00-3:00 PM on [Zoom](#), or by appointment. Please feel free to contact me to set up a meeting.

**Course Catalog Description:**

*The course is designed for M.S.Ed. students seeking an emphasis in mathematics education. It prepares students for attaining expertise and demonstrating leadership regarding how children develop number, operations, algebra, and functions concepts and the corresponding instructional and assessment practices that facilitate this development. Students will learn about: numbers and number systems; the four operations; patterns, functions, and change; and how to model mathematical situations. Students will participate in small-group and individual activities which may include, but are not limited to: electronic discussions, research papers, problem sets, and exams to demonstrate their understanding of course content.*

**Essential Question:** What are the big mathematical ideas in the domains of number and operations and algebra and how do they progress throughout a student's time in school?

**Objectives:**

- Represent numbers, relationships among numbers, and number systems in multiple ways
- Describe the meanings of the operations and how they relate to one another
- Compute fluently and make reasonable estimates
- Identify, describe, and expand patterns, relations, and functions
- Represent and analyze mathematical situations and structures using algebraic symbols, including situations involving change
- Analyze change in various contexts

- Describe students' understandings and common misunderstandings with regard to number, operations, algebra, and functions.

**Required Texts:**

**EU:** Lloyd, G., Beckmann, S., Zbiek, R. M., & Cooney, T. (2010). *Developing essential understanding of functions for teaching mathematics in grades 9-12*. National Council Teachers of Mathematics.

**PFC:** Shifter, D., Bastable, V., & Russell, S.J. (2019). *Developing mathematical ideas: Algebra ~ patterns, functions, and change casebook*. National Council Teachers of Mathematics.

**RAO:** Shifter, D., Bastable, V., & Russell, S.J. (2018). *Developing mathematical ideas: Number and operations, part 3 ~ Reasoning algebraically about operations casebook*. National Council Teachers of Mathematics.

**Other Required Materials:**

Computer, tablet, or other Internet enabled device

**Grades:**

Grades for each of the assignments will be combined to determine the final course grade. Grades are as follows:

A = 90% - 100%

B = 80% - 89%

C = 70% - 79%

D = 60% - 69%

F = 59% and below

**Assignments:**

1) Case discussions	<b>30%</b>
• <i>Reasoning algebraically about operations</i>	10%
• <i>Patterns, functions, and change</i>	10%
• <i>Essential understandings of functions in grades 9 - 12</i>	10%
2) Math activities	<b>30%</b>
• <i>Reasoning algebraically about operations</i>	10%
• <i>Patterns, functions, and change</i>	10%
• <i>Essential understandings of functions in grades 9 - 12</i>	10%

3) In-Person Workshops (Saturday's 9/14, 10/26, and 12/14)	15%
4) Learning Progression Presentation (Due: Saturday, December 14)	15%
5) Reflections and Resources Assignment (Due: Sunday, December 22)	10%
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	Total = 100 %

**Late Work:**

Assignments are due on Sundays at midnight. Unless you let me know ahead of time and we have a previously agreed upon arrangement, late work will lose credit. This decision will be made at my discretion and only after we have communicated about the situation and a late assignment may receive no credit. Therefore, if you require an extension, *please contact me at least 24 hours before the class in which the assignment is due.* You and I can then discuss the options for handing in your assignment. Please be aware that you are expected to complete each assignment thoroughly. It is expected that assignments will be edited carefully for spelling and grammar; your work should satisfy professional standards of teaching.

PLEASE NOTE: As with absences, I do recognize that there are extenuating circumstances. However, if you do not contact me about an extension at least 24 hours before an assignment is due to make alternate arrangements, work will be considered late and treated as such.

**Online Discussions:**

In order for our online discussions to be effective, we must all commit to being present and engaged throughout the course. Just like in a face-to-face discussion, a discussion in an online environment is best when it is dynamic and interactive. Strategies that support an online discussion include checking in and posting short responses and ideas on an ongoing basis, throughout the duration of the discussion. Frequent, shorter posts are better and engender stronger conversations than one long post right before a discussion is closed. As in face-to-face interactions, it is expected that virtual interactions remain professional, respectful, and polite. Remember that tone is hard to infer online. I will be checking discussions to “observe” what is happening and will participate from time to time. There are other times when I will simply be present. Again, this is analogous to conversations that occur in face-to-face settings.

**Academic Integrity:**

Academic integrity is a fundamental part of a successful and thriving university environment. We are a community of learners at UMF and thus learn from and with one another. In order to do this productively, we must all subscribe to the Code of Academic Integrity. Academic integrity means that you are completing your own work at all times. When you refer to outside sources in your assignments, you must give proper credit to the source of the work. Outside sources include articles (journal or newspaper), websites and other media, ideas from friends, peers, and

colleagues, material you looked up in books or received in another course, and so on. In addition to direct quotations, you must cite the scholarly ideas and findings of others. Further, when engaged in scholarly discussions, you should give credit to authors, classmates, or professors when using their ideas. In your assignments, you should **cite using APA style**. You should also be aware of the UMF Academic Integrity Code in the Catalog. It is your responsibility to learn and apply academic integrity to your own work in an ethical manner. The Code of Academic Integrity is in force in this class and any violations will be considered ethical and scholarly infractions. They will be dealt with accordingly. Again, it is your responsibility to educate yourself about these standards. If you have questions, or are in doubt, you should always ask questions and/or seek additional advice. More information can be found at:

<https://catalog.umf.maine.edu/>.

**Equal Educational Opportunity:** Equal educational opportunity is offered to students with special needs due to a disability. Please notify me if a reasonable accommodation is needed to help you meet the course requirements. Students with disabilities who anticipate needing classroom accommodations are encouraged to contact the [Learning Assistance Center](#) at (207) 778-7295.

### **Electronic “Netiquette”**

Please be professional in all of your email and communication. Address the person to whom you are writing, check your spelling, and use proper grammar. Text messaging language is not acceptable in professional or academic communication. Tone and sarcasm are difficult to convey over email so be clear and concise in your writing. The Academic Integrity Code applies in electronic communication, so you need to give proper credit, even in emails, when the words or information you are using are not your own. Before you send an email ask yourself if this is something that is in the syllabus, that you can answer for yourself, or is better left to be discussed in person. Remember that you are beginning to create your own professional image and electronic communication is a factor in this image. ***You can expect me to respond to your emails during regular work hours (Monday – Friday 9:00am – 5:00pm)***. It is possible that I may respond to you at other times, but that should not be assumed. Do not wait until the last minute to email me unless it is an extenuating circumstance.

# Schedule and Tasks:

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## Session 1: Tuesday, September 3 - Saturday, September 14 (Online Class Saturday 9/14: 9AM - Noon)

- Fill out a "Getting to Know You" slide in our shared Google Slides file.
  - Make a comment on at least two (2) of your classmates' "Getting to Know You" slides.
  - Read chapters 1 - 3 of Reasoning Algebraically about Operations (RAO).
  - Respond to the Focus Questions and two (2) of your classmates' responses (total).
  - Come to class Saturday 9/14 having completed the above tasks beforehand.
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## Session 2: Sunday, September 15 - Sunday, September 29

- Read Chapters 4 - 6 of RAO
  - Respond to the Focus Questions and two of your classmates' responses (total).
  - Do the Math Activities and comment on two of your classmates' work (total).
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## Session 3: Sunday, September 29 - Sunday, October 13

- Read Chapters 7 & 8 of RAO.
  - Read Chapters 1 & 2 of Patterns, Functions, and Change (PFC).
  - Respond to the Focus Questions and two of your classmates' responses (total).
  - Do the Math Activities and comment on two of your classmates' work (total).
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## Session 4: Sunday, October 13 - Saturday, October 26 (Online Class Saturday 10/26: 9AM - Noon)

- Read Chapters 3 - 5 of Patterns, Functions, and Change (PFC).
  - Respond to the focus questions.
  - Come to class Saturday 10/26 having completed the above tasks beforehand.
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## Session 5: Sunday, October 27 - Sunday, November 10

- Read Chapters 6 - 8 of PFC.
  - Read the Introduction to Essential Understandings of Functions (EU).
  - Respond to the Focus Questions and two of your classmates' responses (total).
  - Do the Math Activities and comment on two of your classmates' work (total).
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## Session 6: Sunday, November 10 - Sunday, November 24

- Read pages 7-52 of Chapter 1 of Essential Understandings of Functions (EU).
  - Respond to the focus questions, and two of your classmates' responses.
  - Do the Math Activities and comment on two of your classmates' work.
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## Session 7: Sunday, November 24 - Sunday, December 8

- Read pages 52-84 of Chapter 1 of Essential Understandings of Functions (EU).
  - Respond to the focus questions, and two of your classmates' responses.
  - Do the Math Activities and comment on two of your classmates' work.
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## Session 8: Sunday, December 8 - Saturday, December 14 (In-person class at UMF 9AM - 3PM!)

- Read Chapters 2 and 3 of EU
  - Come to class Saturday 12/14 prepared to discuss the reading.
  - Finalize your Learning Progression Presentation to present in class 12/14.
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## Session 9: Sunday, December 15 - Sunday, December 22

- Complete your Reflections and Resources Assignment.
  - Comment on two of your peers' Reflections and Resources assignments.
  - Fill out a course evaluation when you get a minute. Thanks!
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