

EDSP 485-683**Assessment and Instruction in Mathematics in Special Education**

Class Meeting Time: Thursdays (4:15-7:00 pm)
Location: Benjamin 1107

Instructor**Office Hours**

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After class and by
 appointment

COURSE OVERVIEW

The overarching goals of this course are to learn evidence-based methods for teaching and assessing mathematics to students with diverse learning needs. ***Four of the most widely researched evidence-based practices (EBP) that help students with disabilities learn mathematics are (1) the use of explicit instruction, (2) the use of concrete-representational-abstract framework, (3) the use of schemas or heuristics for problem solving, and (4) providing supplemental practice to establish conceptual understanding and computational fluency.*** Course format will include in-class activities and discussions, and reading reflections.

Instructional services for struggling learners can be conceptually organized within a Response to Intervention (RTI) framework. The RTI model calls for using EBP with all students, therefore we will review several high quality Tier One Curricula and EBP for teaching all students. We will also review progress monitoring and formative assessments to identify children who are at risk for mathematical difficulties. Finally, we will explore several potentially EBP Tier 2 and Tier 3 Curricula and Instructional Practices, and practice their application.

This course should also prepare you to begin to reflect and continue learning to teach diverse learners (i.e., students from culturally/linguistically diverse backgrounds, students with exceptionalities, and students with difficulties in mathematics) to develop their mathematical literacy.

LEARNING OUTCOMES/GOALS

Our mission is to realize the capacity of mathematics development of *all* children, particularly those with disabilities, so they have the intellect and resiliency to understand a rapidly changing world and successfully apply essential mathematics in their everyday lives and future occupations. In so doing, we propose a balanced curriculum related to the ***Maryland College and Career-Ready Standards.***

To reach these goals, we ask each student in EDSP 485_683 to commit to the following this semester: (1) work alongside others enrolled in this course to form an engaged community of risk takers; (2) seek to understand mathematics reasoning deeply; and (3) develop your own philosophy about teaching mathematics. Additional course objectives are below:

Learning Outcomes By the end of the semester, students will be able to:	NCTM and NCATE	CEC	InTASC, MTTD & COE
a) Differentiate and utilize the National Council of Teachers of Mathematics (NCTM) Standards for teaching mathematics, and content and practice standards of the Common Core State Standards in Mathematics (CCSSM),	8.4; 8.5	Standard 3: Curricular Content Knowledge CC7K3; CC8K5	InTASC 4 Curriculum
b) Explain risk factors or early warning signs for mathematics difficulties as well as understand the research base on etiology of mathematics disability	7.1, 8	Standard 1: Individual Learning Differences CC2K5, CC2K6	InTASC 1 Learners
c) Evaluate different forms of math assessment for students with learning problems (e.g., informal mathematics tasks, progress monitoring and standardized measures) and translate information from each for setting instructional goals and classroom instruction	7.1, 7.5, 8.3	Standard 4: Assessment CC8K4, CC8S2, CC8S5	InTASC 6 MDTTS Standard IV Educational Goals and Assessment
d) Locate, evaluate, select, and practice using varying evidence-based math pedagogies to plan instruction that will reinforce foundational mathematics skills for struggling learners while working toward general curriculum goals. This includes applying key special education pedagogical principles (e.g., scaffolding, cognitive strategies, prompting, promoting self-regulation) and for different purposes (e.g., within a multi-tiered delivery system)	7.1, 8.7	Standard 5: Instructional Planning and Strategies CC7K2, CC7S1, CC7S5, CC7S10, CC7S11 IGC, Standard 4 Strategies, IGC, Standard 7 Instructional planning	InTASC 7 MDTTS Standard V EC5 Learners, Pedagogy
e) Demonstrate facility in applying evidence-based approaches for teaching mathematics content from early numeracy through algebra. This may include counting and cardinality, number operations, ratios, fractions, proportional relationships, or algebraic thinking (expressions and equations)	Standard 1; Standard 2; 7.2; 7.4; Standards 9-15; CCSMP Standard 2	Standard 3: Curricular Content Knowledge IGC, Standard 4 Instructional Strategies	InTASC 8 MDTTS Standard I, V EC 7 Subject Matter, Pedagogy
f) Plan instruction in one math content area based on study of one or more children's mathematical reasoning,	NCTM Standard 3; CCSMP Standard 1	Standard 7: Collaboration CC10S8	InTASC 1 MDTTS Standard II EC 4 Reflection
g) Considers multicultural and cross-curricular	NCTM 7.1,	Standard 1:	InTASC 2, 3

connections in math and the implications for meeting the needs of a diverse classroom in lesson planning	9.10, 10.6, 11.8, 12.5, 13.4, 14.8, 15.4	Individual Learning Differences	EC 1 Social and Cultural Contexts
h) SmartNotebook and other forms of technology (virtual manipulatives) as well as using technology to locate resources	NCTM Standard 6, 7.6, 8.9, 10.5, 12.4; 13.3	Standard 7: Collaboration CC10S8	MDTTS Standard V EC 5 Innovation and Creativity

Learning outcomes for this course are based on the following resources and guidelines:

- Council of Chief State School Officers & National Governors' Association. (June, 2010). *Common core state standards for mathematics*. Common core state standards initiative. Retrieved [on line] June 2010: <http://www.corestandards.org/the-standards/mathematics>
- Council of Chief State School Officers. (2011, April). Interstate Teacher Assessment and Support Consortium (InTASC) Model Core Teaching Standards: A Resource for State Dialogue. Washington, DC: Author.
- Council for Exceptional Children (2012). *CEC Initial level special educator preparation standards*. Retried from: <http://www.cec.sped.org/~media/Files/Standards/Professional%20Preparation%20Standards/Initial%20Preparation%20Standards%20with%20Elaborations.pdf>
- Fuchs, L. S., Fuchs, D., Powell, S. R., Seethaler, P. M., Cirino P. T., & Fletcher, J. M. (2008). Intensive intervention for students with mathematics disabilities: Seven principles of effective practice. *Learning Disability Quarterly*, 31, 79–92.
- Interstate Teacher Assessment and Support Consortium (2011). InTASC Model core teaching standards (InTASC)
- Maryland State Department of Education. Maryland Teacher Technology Standards (MDTTS). Retrieved [on line] January 2012: <http://www.mttsonline.org/standards/>
- National Council of Teachers of Mathematics (2000). *Principles and standards for school mathematics*. Reston, VA: NCTM.
- University of MD College of Education Conceptual Framework (COE)

Required Text/Materials:

- Forbringer, L. L., & Fuchs, W. W. (2014). *RtI in Math: Evidence-Based Interventions for Struggling Students*. New York, NY: Routledge. [referred to as *RTI* in course schedule, see below]
- Van de Walle, J., Karp, K. S., & Bay-Williams, J. M. (2016). *Elementary and Middle School Mathematics Methods: Teaching Developmentally* (9th edition). Upper Saddle River, NJ: Pearson Education, Inc. [referred to as *Teaching Developmentally* in course schedule, see below]

Other required readings are available on the ELMS course site:

1. Agrawal, J., & Moran, L. L. (2016). Evidence-based practices: applications of concrete representational abstract framework *Learning Disabilities Research & Practice* 31(1), 34-44.
2. Bryant, B. R., Bryant, D. P., Porterfield, J., Dennis, M. S., Falcomata, T., Valentine, C., . . . Bell, K. (2016). The effects of a tier 3 intervention on the mathematics performance of second grade students with severe mathematics difficulties. *Journal of Learning Disabilities*, 49(2), 176–188.

3. Ciullo, S., SoRelle, D., Kim, S. A., Seo, Y., & Bryant, B. R. (2011). Monitoring student response to mathematics intervention: Using data to inform tier 3 intervention. *Intervention in School and Clinic, 47*(2), 120–124.
4. Gevarter, C., Bryant, D. P., Bryant, B., Watkins, L., Zamora, C., & Sammarco, N. (2016). Mathematics interventions for individuals with autism spectrum disorder: A systematic review. *Review Journal of Autism and Developmental Disorders*. Advance online publication.
5. Hunt, J. H., & Little, M.E. (2014). Intensifying interventions for students by identifying and remediating conceptual understandings in mathematics. *Teaching Exceptional Children, 46* (6) 187-196.
6. Jitendra, A., (2002). Teaching students math problem-solving through graphic representations. *Teaching Exceptional Children, 34* (4), 34-38.
7. Jitendra, A. K., Star, J. R., Starosta, K., Leh, J. M., Sood, S., Caskie, G., et al. (2009). Improving seventh grade students' learning of ratio and proportion: The role of schema-based instruction. *Contemporary Educational Psychology, 34*, 250–264.
8. Pfannenstiel, K. H., Bryant, D. P., Bryant, B. R., & Porterfield, J. (2015). Cognitive strategy instruction for teaching word problems to primary-level struggling students. *Intervention in School and Clinic, 50*(5), 291–296.
9. Powell, S. R., & Fuchs, L. S. (2015). Intensive intervention in mathematics. *Learning Disabilities Research & Practice, 30*(4), 182–192.
10. Rivera, C. J., & Baker, J. N. (2013). Teaching students with intellectual disability to solve for X. *Teaching Exceptional Children, 46* (2) 14-21.

Required Readings for Curriculum Analysis Assignment:

Tier 1 Curriculum/Programs: [Note there is a WWC Intervention Report for each program]

Everyday Math – Elementary Curriculum [I will model how to do assignment]

Saxon Math – Elementary and Middle School [Group 1: _____, _____, & _____]

Connected Math – Middle School [Group 2: _____, _____, & _____]

Tier 2 and 3 Curriculum/Programs:

Roots (Kindergarten) [Group 3: _____, _____, _____, & _____]

- Doabler, C.T., Clarke, B., Kosty, D. B., Kurtz-Nelson, E., Fien, H., Smolkowski, K., & Baker, S. (2016). Testing the efficacy of a tier 2 mathematics intervention. *Exceptional Children, 83* (1) 92-110.

Number Rockets (First Grade) [Group 4: _____, _____, _____, & _____]

- Fuchs, L.S., Compton, D.L., Fuchs, D., Paulsen, K., Bryant, J.D., & Hamlett, C.L. (2005). The prevention, identification, and cognitive determinants of math difficulty. *Journal of Educational Psychology, 97*, 493-513.

Hot Math Tutoring (Third Grade) [Group 5: _____, _____, _____, & _____]

- Fuchs, L.S., Fuchs, D., Craddock, C., Hollenbeck, K.N., Hamlett, C.L., & Schatschneider, C. (2008). Effects of small-group tutoring with and without validated classroom instruction on at-risk students' math problem solving: Are two tiers of prevention better than one? *Journal of Educational Psychology, 100*, 491-509.

Fraction Face-Off! (Fourth Grade) [Group 6: _____, _____, & _____]

- Fuchs, L.S., Schumacher, R.F., Long, J., Namkung, J., Hamlett, C.L., Cirino, P.T., Changas, P., Jordan, N.C., Siegler, R., & Gersten, R. (2012). Improving At-Risk Learners' Understanding of Fractions. *Journal of Educational Psychology, 105*(3), 683-700. doi: 10.1037/a0032446

Mathematics Institute for Learning Disabilities and Difficulties (Middle school)

[Group 7: _____, _____, & _____]

- Hunt, J. H., & Vasquez III, E. (2014). Effects of ratio strategies intervention on knowledge of ratio equivalence for students with learning disability. *The Journal of Special Education, 48*(3), 180-190. doi:10.1177/0022466912474102

Additional Online Resources for Curriculum Analysis Assignment:

What Works Clearinghouse – <http://ies.ed.gov/ncee/wwc/>

WWC practice guide, assisting students struggling with mathematics: RtI for Elementary and Middle Schools <https://ies.ed.gov/ncee/wwc/practiceguide/2>

IRIS Website: <http://iris.peabody.vanderbilt.edu/index.html>

CEEDAR Center (“Collaboration for Effective Educator Development, Accountability and Reform”): <https://cedar.education.ufl.edu/>

The Meadows Center for Preventing Educational Risk – www.meadowscenter.org

Center on Instruction <http://centeroninstruction.org/>

Best Evidence Encyclopedia www.bestevidence.org/

National Center on Response to Intervention (Instructional tools chart):

www.rti4success.org/tools_charts/instruction.php

Promising Practices Network www.promisingpractices.net/programs.asp (archived 2014)

Resources for lesson planning assignment:

EDSP lesson plan template

BetterLesson <http://betterlesson.com/home>

COURSE ASSIGNMENTS

Assignment	Description	Percent of Grade
Reading Reflections Due midnight each Wednesday	Complete 6 of the 8 Reading Reflections include questions linked to Power Points, video cases, and/or readings about mathematical problems and tasks related to the core practices of teaching. You may skip 2 or drop your lowest 2 grades. LATE work will not be accepted given this policy.	30% (5% each)
Curriculum Analysis of Evidence-based Tier 1, 2, & 3 Programs	Working in groups, students will complete a written analysis of one EBP or potentially EBP program/curriculum and a corresponding published article followed by an in-class demonstration for peers on how to use with children (with some students taking the role of novice learner and other students observing and reflecting on what goes on during presentation).	30%
Lesson Plan	Towards the end of the semester, we will apply course information to plan a lesson that you might teach in the future.	10%
Quizzes	In class quizzes (2).	20%
Participation	Sharing your ideas and questions with the group, as well as responding to those of your classmates, is critical to our work	10%

	together. You are expected to attend classes, to arrive on time for a prompt start with entrance tickets, to participate in and contribute to class, and to complete exit tickets to master course objectives (see rubric for more information on page 8).	
		100%

COURSE GRADING

Final course grades will be assigned based on the percentage of possible points earned. The scale used in grading will reflect University of Maryland guidelines.

A+ 98 - 100%	B+ 88 - 89%	C+ 78 - 79%	D+ 68 - 69%
A 94 - 97%	B 84 - 87%	C 74 - 77%	D 64 - 67%
A- 90 - 93 %	B- 80 - 83%	C- 70 - 73%	D- 60 - 63%
			F 0 - 59%

COURSE POLICIES

1. Preparing for Success

- a) READING THE COURSE MATERIAL IS IMPERATIVE. Students cannot master the content of the course without reading the material.
- b) Exchange telephone numbers with at least one classmate to obtain notes and follow-up assignments missed during an absence.
- c) Ask questions whenever information needs clarifying.
- d) When contacting instructors via email, **make sure to put EDSP485/683 in the subject line** so that your email is not treated as spam.

2. Required Texts and Access to Course Content

Online Learning Environment: Course Modules, homework, articles etc. will be found at www.elms.umd.edu under this course name. GO TO:

- a) <https://elms.umd.edu>
- b) Login with your directory ID and password
- c) Go to My Courses (EDSP 485/683)
- d) Use the left side to navigate the appropriate documents or directions (e.g., syllabus, weekly readings, modules, announcements, discussion board, etc.)

3. Guidelines for Submitting Assignments Electronically

- a) When creating and submitting docx, pptx or html files please use a naming convention of your last name followed by the name of the assignment (**e.g., Lee_readingreflection1**).
- b) You should ensure the safety of your work by making regular backups (extra copies) and save your work in multiple places.
- c) Always check what you uploaded to avoid uploading the wrong document.

4. Course Communication

- a) I will respond to all your e-mails within 24 hours during the week and within 48 hours on the weekend.
- b) I will give you feedback and grade most assignments within 1 week of receiving them. Grades will be posted to ELMS as soon as the assignments are graded.
- c) I will post all reading reflections, handouts, and articles on ELMS.

5. Technical Requirements and Technical Support

If you need immediate technical assistance, particularly as related to authentication, browser issues or a feature of ELMS not working correctly, please contact the OIT Student Help Desk, 301-405-1400 (M-F, 8 a.m. – 6 p.m.). You can also send an email to elms@umd.edu. Don't spend more than 20 minutes trying to fix a problem on your own.

6. Policy on Technology Use in Class

Researchers have found that distractions (other than class activities) do in fact interfere with learning and active participation. For more information about the science behind the policy watch: <http://youtu.be/WwPaw3Fx5Hk>

GENERAL COURSE POLICIES

- Your attendance and participation will be evident by your completion of the assignments and in class activities. In all cases, it is your responsibility to make up work and content missed in class and work with the instructors to request modifications to assignment deadlines if needed.
- Should the University close due to inclement weather or other event, we will contact the class via Announcements if we will hold class using a virtual platform, in lieu of a face to face meeting.
- No extra points will be given unless available to all students.
- Late work will not be excepted unless prior arrangements have been approved. Exceptions include a doctor's note if ill or advance notice of observed religious holidays.

Please refer to: <http://www.ugst.umd.edu/courserelatedpolicies.html> for University Policies about your rights and responsibilities as an Undergraduate Student at the University of Maryland.

Participation Rubric

	10	9 - 6	5 - 0
Attendance & Punctuality	<p>Attends <u>every class</u> and <u>always</u> arrives on time.</p> <p>Consistently respects and adheres to the class schedule including, but not limited to, timed breaks.</p>	<p>Misses no more than 1 or 2 classes during the semester.</p> <p>Arrives late or leaves early no more than 2 times during the semester.</p> <p>Regularly respects and adheres to the class schedule including, but not limited to, timed breaks.</p>	<p>Frequently misses class.</p> <p>Frequently arrives late to class (arriving anytime after class start time) or needs to leave early regularly.</p> <p>Inconsistently respects and adheres to the class schedule including, but not limited to, timed breaks.</p>
Participation	<p><u>Consistently</u> participates fully without prompting in general class discussion, discussions of readings, simulations, role-plays, peer reviews, or other activities).</p> <p>Does not engage in unrelated conversations or unrelated work.</p> <p>Phones and other electronic devices are not visible and are silent for the duration of the class.</p>	<p>Regularly, but not always, participates in every aspect of the class without prompting.</p> <p>Rarely engages in unrelated conversations and unrelated work.</p> <p>Phones and other electronic devices are rarely visible and are silent for the duration of the class.</p>	<p>Occasionally participates (with or without prompting) in every aspect of class.</p> <p>Engages in unrelated conversations or work.</p> <p>Engages in texting/emailing during class time</p>
Preparation & Engagement	<p>Reads every assigned reading and comes to class ready to discuss and provide thoughtful, reflective comments.</p> <p>Student routinely offers ideas and asks questions, not only to instructors but also to peers, demonstrating genuine listening skills and reflection about course content.</p> <p>Always brings required coursework materials to class including course syllabus, text, lesson plans, readings, and additional requested materials.</p>	<p>Reads most assigned readings and comes to class ready to discuss and provide thoughtful, reflective comments.</p> <p>Student directs comments to instructors or table partners rather than to the entire class. May miss what peers are saying, because s/he has side conversations or does not pay attention to discussion of class activities.</p> <p>Regularly brings required coursework materials to class including course syllabus, text, lesson plans, readings, and additional requested materials.</p>	<p>Frequently comes to class unprepared.</p> <p>Student rarely contributes to class by offering ideas or asking questions or is frequently distracted by unrelated activities.</p> <p>Regularly fails to bring coursework materials to class including course syllabus, text, lesson plans, readings, and additional requested materials.</p>

TOTAL

TENTATIVE COURSE SCHEDULE			
Week	Topic/Activity	Readings	Assignments
Week 1: 1/25	<ul style="list-style-type: none"> • Introduction to course • Course requirements • Overview of math standards: NCTM & CCSS • Overview of the RTI framework • Math life activity 	<ul style="list-style-type: none"> • Chapters 1 in Van De Walle (<i>Teaching Developmentally</i>) • Chapters 1 in Forbringer & Fuchs (<i>RTI</i>) 	<ul style="list-style-type: none"> • Math life story for participation grade (due at the end of class)
Week 2: 2/1	<ul style="list-style-type: none"> • Unpacking the math standards • Understanding what it means to know and do mathematics • Exploring math assessments <ul style="list-style-type: none"> • Progress monitoring (CBM) in math • PARCC assessments • Key Math diagnostic assessment 	<ul style="list-style-type: none"> • Chapters 2 and 5 in <i>Teaching Developmentally</i> • Chapters 1 and 2 in <i>RTI</i> • ELMS reading # 3 	<ul style="list-style-type: none"> • Reading Reflection 1
Week 3: 2/8	<ul style="list-style-type: none"> • Teaching through problem solving • Technology-enhanced learning https://illuminations.nctm.org • <i>Virtual Manipulatives</i> http://nlvm.usu.edu/en/nav/vlibrary.html 	<ul style="list-style-type: none"> • Chapters 3, 4, & 7 in <i>Teaching Developmentally</i> • Chapter 10 in <i>RTI</i> 	<ul style="list-style-type: none"> • Reading Reflection 2
Week 4: 2/15	<ul style="list-style-type: none"> • Teaching math equitably to all children • Intensifying instruction for struggling learners: Tier 1, 2, and 3 • Curriculum Analysis Demo – Everyday Math 	<ul style="list-style-type: none"> • Chapter 6 in <i>Teaching Developmentally</i> • Chapters 3, 4, & 11 in <i>RTI</i> • ELMS reading # 5 & 9 	<ul style="list-style-type: none"> • Reading Reflection 3
Week 5: 2/22	<ul style="list-style-type: none"> • Exploring evidence-based practices: <ul style="list-style-type: none"> • Concrete and visual representation (CRA) • Explicit instruction 	<ul style="list-style-type: none"> • Chapters 5 and 6 in <i>RTI</i> • ELMS readings # 4 & 10 	<ul style="list-style-type: none"> • Reading Reflection 4
Week 6: 3/1	<ul style="list-style-type: none"> • Developing early number concepts and number sense for the operations 	<ul style="list-style-type: none"> • Chapters 8 and 9 in <i>Teaching Developmentally</i> • Chapter 7 in <i>RTI</i> • Elms reading # 2 	<ul style="list-style-type: none"> • Reading Reflection 5 • Quiz 1
Week 7: 3/8	<ul style="list-style-type: none"> • Developing procedural facility and automaticity with basic facts 	<ul style="list-style-type: none"> • Chapter 10 in <i>Teaching Developmentally</i> • Chapters 8 in <i>RTI</i> 	<ul style="list-style-type: none"> • Curriculum Analysis Group #1; Saxon Math • Reading Reflection 6

Week 8: 3/15	<ul style="list-style-type: none"> Place value, equations, and algebraic thinking (in classroom) 	<ul style="list-style-type: none"> Chapters 11 and 14 in <i>Teaching Developmentally</i> 	<ul style="list-style-type: none"> Curriculum Analysis Group #3; Roots Reading Reflection 7
Spring Break 3/22			
Week 9: 3/29	<ul style="list-style-type: none"> Developing computational strategies for the operations 	<ul style="list-style-type: none"> Chapters 12 and 13 in <i>Teaching Developmentally</i> Elms reading # 6 & 8 	<ul style="list-style-type: none"> Reading Reflection 8 Curriculum Analysis Group #4; Number Rockets
Week 10: 4/5	<ul style="list-style-type: none"> Midpoint survey Developing fraction concepts and operations 	<ul style="list-style-type: none"> Chapters 15 and 16 in <i>Teaching Developmentally</i> Chapter 9 in <i>RTI</i> Elms reading # 1 	<ul style="list-style-type: none"> Curriculum Analysis Group #5; Hot Math Tutoring & #6; Fraction Face-Off!
Week 11: 4/12	<ul style="list-style-type: none"> Developing concepts of decimals and percents Ratios, proportions, and proportional reasoning 	<ul style="list-style-type: none"> Chapters 17 and 18 in <i>Teaching Developmentally</i> Elms reading # 7 	
Week 12: 4/19	<ul style="list-style-type: none"> Hands-on learning session: Developing a lesson plan! 	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> Final Lesson Plan
Week 13: 4/26	<ul style="list-style-type: none"> Exploring measurement concepts Geometric thinking 	<ul style="list-style-type: none"> Chapters 19 and 20 in <i>Teaching Developmentally</i> 	<ul style="list-style-type: none"> Curriculum Analysis Groups #2; Connected Math and #7; Math Institute for LD
Week 14: 5/3	<ul style="list-style-type: none"> Exploring Tier 2 and Tier 3 math curriculum 	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> Review of one math curriculum
Week 15 5/10	<ul style="list-style-type: none"> Course celebrations, evaluation and reflection 	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> Quiz 2