Auburn University Course Syllabus

Course Number: CTEC 3020
Course Title: Primary Math and Science
Credit Hours: 3 semester hours
Prerequisites: Admission to Early Childhood Teacher Education, Completion of CTEC 3030/4911 and CTEC 3200/4200
Co-requisites: CTEC 4912
Instructor: Angela Love, Ph.D., Early Childhood Education Program Coordinator
Office: 5018 Haley Center
E-mail: angela.love@auburn.edu
Office Hours: **Mondays, 3:00-4:30 pm and Wednesdays, 3:00-4:30 pm; and by appointment**

Email communication is best for more prompt response; email for appointment during or outside of office hours

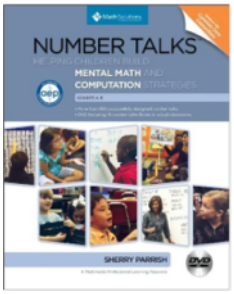
Required Texts:

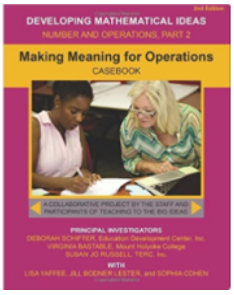
Feeney, S., & Freeman, N. K. (2012). *Ethics and the early childhood educator? Using the NAEYC code, 2nd Ed.* Washington, D.C.: NAEYC. ISBN: 978-1-928896-83-8. (Keep for Internship)

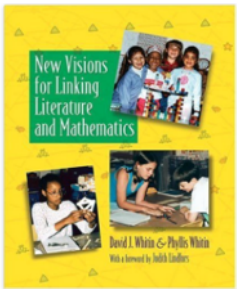
Parrish, S. (2014). *Number talks: Helping children build **mental math** and **computation** strategies.* Sausalito, CA: Math Solutions. ISBN 978-1-935099-62-8. (Keep for teaching)

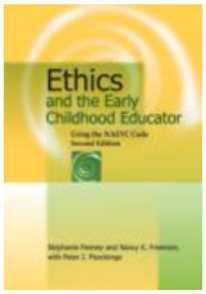
Schifter, D., Bastable, V., & Russell, S. J. (2010). *Developing mathematical ideas number and operations, part 2: Making meaning for operations casebook, 2nd Ed.* Boston: Pearson Education. ISBN 978-013-373314-3. (May share)

Whitin, D. J., & Whitin, P. (2014). *New visions for linking literature and mathematics.* Urbana, IL: National Council of Teachers of English. (Keep for teaching)









You are required to have a composition notebook for your math journal and science notebook.
Required reading includes articles from journals. All readings will be announced on Canvas and provided whenever possible (in Files).

<u>*Important Websites:</u>
***You will be expected to use these websites as resources for assignments and teaching, both in-class and for practicum.**

Investigations in Number, Data, & Space
- curriculum & the CCSS: https://investigations.terc.edu/CCSS/
- online games/activities for grades K-1: http://investigations.terc.edu/library/Games_K1.cfm
- online games/activities for grades 2-3: http://investigations.terc.edu/library/Games_23.cfm
- games/activities to do offline: http://investigations.terc.edu/families/doing_math/books_and_resources/
- Investigations support resources (number talks, blackline masters, CCSS, math links, etc): https://sites.google.com/site/get2mathk5/home/investigations-support
- Illuminations: http://illuminations.nctm.org
- Blackines, templates for math games: https://sites.google.com/site/get2mathk5/home/templates-graphic-organizers

Professional Development - inside mathematics (problem of the month by grade level, video: http://insidemathematics.org
Math Dictionary for Kids: http://www.amathsdictionaryforkids.com/dictionary.html
Next Generation Science Standards
- A Framework for K-12 Science Education: https://www.nap.edu/download.php?record_id=13165#

Children & Nature Network: http://www.childrenandnature.org
Engineering Toys for Girls
- GoldieBlox (Debbie Sterling, founder) website: http://www.goldieblox.com/pages/about

- GoldieBlox YouTube Channel: https://www.youtube.com/channel/UCJUn6QmXuFV9CkuJB9T7F_w

Academic Language

- New Teacher Center Oral Language Development: http://old.newteachercenter.org

Other Useful Websites

National Association for the Education of Young Children: http://www.naeyc.org
National Council of Teachers of Mathematics (NCTM): http://www.nctm.org
National Science Teachers Association (NSTA): http://www.nsta.org
National Council of Teachers of English (NCTE): http://www.ncte.org
Alabama Math, Science, and Technology Initiative: http://www.amsti.org
Alabama State Department of Education: http://www.alsde.org
American Montessori Society: http://www.amshq.org
North American Montessori Teachers Association: http://www.montessori-namta.org

Recommended Texts:

Caldwell, J. H., Karp, K., Bay-Williams, J. M. (2010). *Developing essential understanding of addition and subtraction for teaching mathematics in prekindergarten - grade 2*. Reston, VA: The National Council of Teachers of Mathematics, Inc. (CCSS Big Ideas in math)

Dougherty, B. J., Flores, A., Louis, E., & Sophian, C. (2010). *Developing essential understanding of number and numeration for teaching mathematics in prekindergarten - grade 2*. Reston, VA: The National Council of Teachers of Mathematics, Inc. (CCSS Big Ideas in math)

Kamii, C. (2004). *Young children continue to reinvent arithmetic, 2nd grade: Implications of Piaget's theory*. New York: Teachers College. (Math games)

Kamii, C. K., & DeVries, D. (1993). *Physical knowledge in preschool education: Implications of Piaget's theory*. New York, NY: Teachers College Press (Science)

****Louv, R. (2008). *Last child in the woods: Saving our children from nature-deficit disorder*. Chapel Hill, NC: Algonquin Books.**

****Ratey, J. J. (2008). Spark: *The revolutionary new science of exercise and the brain*. New York: Little, Brown & Co.**

Whitin, P., & Whitin, D. J. (2000). *Math is language too: Talking and writing in the mathematics classroom*. Urbana, IL: National Council of Teachers of English (NCTE). (Math discourse and journaling)

****Highly recommended for you as a teacher and healthy person.**

COURSE DESCRIPTION

This course is to provide pre-service teachers opportunities to be more knowledgeable and practical in early childhood (Pre-K, K-3rd grade) curriculum and instruction in the areas of mathematics and science. Pre-service teachers will have a better understanding of children's learning and development, curriculum development, and instructional methods. Based on their understanding of early learning standards as well as aforementioned areas, pre-service teachers will apply their knowledge to designing, implementing, and evaluating the interdisciplinary curriculum. In addition, through hands-on activities and teaching demonstrations, they will also develop

effective teaching strategies working with young children that can be used in their future classrooms.

COURSE OBJECTIVES
Upon completion of the course, students will be able to:

1. Identify important mathematics /science content, process skills, and attitudes appropriate to young children. (NAEYC Standard 1b, 4a, 4b, 4c, & 4d)
2. Become acquainted with the principles and elements of curriculum development (e.g., goal setting, planning, implementing, and assessing curriculum) in mathematics and science. (NAEYC Standard 1a, 1b, 1c, 4b, 4c & 4d)
3. Develop an understanding that early childhood curriculum is an integrated curriculum, and that children's learning in mathematics and science takes place in integrated learning experiences with concrete materials in a variety of contexts. (NAEYC Standard 4c)
4. Design, implement, and evaluate developmentally appropriate curricular content, strategies, and instructional materials, and reflect on their performance. (NAEYC Standards 1a, 1b, 1c, 4b, 4c, & 4d)
5. Understand how to record, report, and evaluate development level of young children through naturalistic/performance-based assessment and utilize developmentally appropriate assessment and reporting techniques. (NAEYC Standards 3a, 3b, & 3c)

AUBURN COLLEGE OF EDUCATION-CONCEPTUAL FRAMEWORK

<u>Competent</u>
Competent professionals demonstrate the knowledge and skills needed to facilitate the learning of the individuals they serve. Their competence enables them to model and promote active, collaborative, and ongoing learning. Their efforts are enhanced by their abilities to foster learning communities that are safe, stimulating, and enriched with diversity; engage in reasoned and purposeful decision making; and implement their professional practices in proactive, flexible, and self-regulating ways.
We recognize that the development of professional competence is linked to levels of preparation and experience. We also acknowledge that competence continues to develop over the course of an entire career.

<u>Committed</u>
Committed professionals make reasoned decisions based on thoughtfully constructed values. As a College, we strive to nurture values that support the learning of all people, honor diversity, protect the integrity of learning, and expand the scholarship of our professions. We view these values as professional dispositions, and we define them as filters for responsible decision-making. Our College emphasizes the conscious development of commitments related to professional responsibilities and ethics, collaboration, diversity, and intellectual vitality.

Reflective

We choose to frame reflection as a critical and pervasive habit of mind that permeates and fuels the ongoing expansion of competence and the continued development of reasoned commitments. Reflective professionals subject their own competencies and commitments to continuous scrutiny as they systematically monitor the impact of their professional practices on the individuals they serve and make adjustments as needed. Thoughtful reflection emphasizes reviewing and analyzing past practices in ways that influence and improve future practices. This stance inspires self-initiated professional growth and results in increased capacities for addressing the complexities and dilemmas situated within the work of educational and human services professionals.

COURSE REQUIREMENTS

Specific criteria in rubric format will be discussed as due date approaches for items 1-5.

1. **Math Journal/Notebook of Lessons, Ideas, Weekly Reflections, & Weekly observations (25 Points):**

Teacher candidates will maintain a math/science journal
a.that references math lessons demonstrated in class and in the field, identifying the Common Core Content and Practice/Next Generation Science Standards that each addresses.
b.with reflections from investigating problems, case studies, number talks, readings, and class discussions/lectures.
(See Appendix C for some math journal starter questions)

2. **Number Talks IN-CLASS Discussion Leader (in pairs) (15 points).**
3. **Mathematics case study analysis (Part 1 - Discussion) (20 Points)**
4. **Mathematics case study analysis (Part 2 - Written) (20 Points)**
5. **Science Investigation (20 points)**
6. **Family Resource & Engagement Plan (20 points)**
7. **In-class Quizzes (20 points)**
8. **Participation and Professional Behavior (25 Points):** All students are required to attend all classes, be punctual, and be active participants in class discussions and activities. Students are also expected to be respectful to others by not displaying disruptive or inappropriate behavior during class. (*This includes talking while another student has been acknowledged to speak, as well as while the instructor is speaking, texting or using a mobile device in any other inappropriate manner unrelated to the course*.) Points will be deducted from the original 15 when an infraction occurs (as determined by the instructor) and the student will be notified that points were deducted within a reasonable time after the infraction. Each incidence of unprofessional behavior will result in a 2-4 pt. deduction, depending on whether the behavior has already been addressed or not, from the 15 points allotted for this course requirement.

GRADES

Requirements and Points	Grades
➢ Math Journal/Notebook (25 points) ➢ NT Study Discussion Leader (15 points) ➢ Mathematics case study analysis (Part 1) (20 points) ➢ Mathematics case study analysis (Part 2) (20 points) ➢ Science Experience (20 points) ➢ Family Engagement Activity/Plan (20 points) ➢ In-class Quizzes (20 points) ➢ Class Participation and Professional Behavior (25 points) Total: 165 points	A =149-165 points B = 132-148 points C = 116-131 points D = 99-115 points F = <99 points

CLASS POLICY STATEMENTS

Participation: Students are expected to participate in all class discussions and participate in all exercises. It is the student's responsibility to contact the instructor if assignment deadlines are not met. Students are responsible for initiating arrangements for missed work.

Attendance/Absences: Attendance is required at each class meeting. If an exam is missed, a make-up exam will be given only for University-approved excuses as outlined in the Student Policy eHandbook. Arrangement to take the make-up exam must be made in advance. Students who miss an exam because of illness need a doctor's statement for verification of sickness and should clear the absence with the instructor the day they return to class. Other unavoidable absences from campus must be documented and cleared with the instructor in advance. **Each unexcused absence** will result in 5 points deducted from the class participation grade. **Tardy arrivals** will result in 2 point deducted from the class participation grade. If points from absences and tardy arrivals exceed the 20 points allotted for class participation, the points will be taken from the final total. **Three unexcused absences may result in a teacher candidate being dropped from the program**.

Accommodations: Students who need accommodations are asked to electronically submit their approved accommodations through AU Access and to arrange a meeting during office hours the first week of classes, or as soon as possible if accommodations are needed immediately. If you have a conflict with my office hours, an alternate time can be arranged. To set up this meeting, please contact me by e-mail. If you have not established accommodations through the Office of Accessibility, but need accommodations, make an appointment with the Office of Accessibility, 1228 Haley Center, 844-2096 (V/TT). See https://fp.auburn.edu/disability/faculty/syllabus.asp

Honesty Code: The University Academic Honesty Code and the Student Policy eHandbook Rules and Regulations pertaining to Cheating and Plagiarism will apply to this class. See https://sites.auburn.edu/admin/universitypolicies/Policies/AcademicHonestyCode.pdf

Professionalism: As faculty, staff, and students interact in professional settings, we are expected to demonstrate professional behaviors as defined in the College's conceptual framework. These professional commitments or dispositions are:

1. Creates a caring and supportive learning environment and encourages self-directed learning by ecah student..
2. Demonstrates behaviors that are consistent with the ideals of fairness and the belief that all students can learn.
3. Demonstrates, models, and exemplifies a commitment to diversity.
4. Engages in responsible and ethical professional practices (shows trustworthiness, nurtures professional relationships, maintains confidentiality regarding students and school matters).
5. Demonstrates professionalism by being prepared, dressing professionally, communicating appropriately, and fulfilling attendance expectations.
6. Shows respect for and cooperates with students, families, colleagues, and members of the community.
7. Shows initiative and self-direction in classroom activities (e.g., organization and management of classroom, planning and implementation of instruction).
8. Follows policy regarding use of digital tools and models digital citizenship and responsibility (e.g., the appropriate use of social media).
9. Contributes to collaborative learning community, models and nurtures intellectual vitality, and demonstrates interest and enthusiasm for the profession.
10. Accepts/acts on constructive criticism and suggestions in a professional way.
11. Monitors and adjusts own professional dispositions as necessary.
12. Reflects on and analyzes past practices to stimulate ongoing improvement for future practice.

*Mobile Device Policy: Smartphone use or text messaging or unapproved iPad/Tablet or laptop usage during the class session is viewed as extremely unprofessional and will result in an automatic loss of 5 points of **Class Participation and Professional Behavior grade points** (under COURSE REQUIREMENTS) **for the first occurrence; additional points will be deducted for repeated occurrences.** It is best that phones, iPads, and laptops not be visible during the class session to avoid any misunderstanding of their use.

APPENDIX A

Proposed Calendar

This calendar is subject to change based on the needs of the class, knowledge gained, and practice needed to master the concepts taught in this course. Dr. Love will make this determination and give adequate notice of any revisions made. Cohorts B & C both meet in Haley 2438 in the morning; B meets in 2442 and C in 2454 in the afternoon.

Week of	1st class of the wk	2nd class of the wk
Aug.17 Haley Center 7:15-11:45 am	Syllabus/Intro to Developing Mathematical Thinking	Inquiry Approach to learning math/ Number Talks (NT)—CH 1-2
Haley Center 1-2:25 pm	Syllabus/CCSS	CCSS/NT
Aug. 24 HC 7:15-11:45a	NT—CH3	NT—CH4 **(in pairs - lead NT & class discussion)***
HC 1-2:25p	Case Study Analysis—Number & Operation cases 1-3 **(in pairs - lead NT & class discussion)***	Case Study Analysis—Number & Operation cases 8-10 (**in pairs - lead NT & class discussion)***
Aug. 31 Haley Center 7:15-11:45a	Linking Lit. to Math—CH 1-3 (in pairs - lead NT & class discussion)*	Linking Lit. to Math—CH4-5
HC 1-2:25p	NT/Case Study cases 17 & 22	NT—CH5-7
Sept. 7-Oct. 29 AEEC	Full Day Practicum (except Sept. 7, Labor Day)	Full Day Practicum (except Oct. 15, Fall Break)
Nov 2-AEEC 7:15-11:45a	1/2 Day Practicum	1/2 Day Practicum
Nov. 2 HC 1-2:25p	AMSTI - CCSS/NCTM Stds by Grade Level	AMSTI—1st grade **Family Resource & Engagement Plan***
Nov. 9-12 7:15-11:45a AEEC**	Nov. 9-10—AEEC 1/2 Day Practicum	Nov. 11-**Cohort B** Haley 2438 Nov. 12-AEEC **Cohort C** only**
Nov. 9 HC 1-2:25p	AMSTI/Case Study Building a System of Tens **(Case Study Part 1)***	AMSTI—1st grade & adaptations to K-3 (Case Study Part 1)
Nov 16-7:15-11:45a	AEEC-1/2 Day Practicum	AEEC-1/2 Day Practicum
Nov. 16 HC 1-2:25p	**Review Case Studies (Part 2)***	Review Case Studies (Parts 2)
Nov 30-7:15-11:45a	AEEC-1/2 Day Practicum	AEEC-1/2 Day Practicum
Nov. 30 HC 1-2:25p	**Science Investigations***	Science Investigations

Indicates Due Dates

APPENDIX B
Math Lesson Planning

Name:	Observation Date:
Pre-Conference	Post-Conference

Unit Lesson Title

Focus:	
Vocabulary:	
CCSS Practices Std:	CCSS Content Std:
Background:	
Quick practice:	

Activity	Materials	Time

-to accompany the 5E LP format

Reteach Activity	Materials	Time

Teaching notes:

Class Management (focus strategy)

Learning Community (engagement strategy of all learners):

-to accompany the 5E LP format

APPENDIX C
Math Journal

QUESTIONS TO KICK-START MATH JOURNALING

Solving math problems

1. How did you solve that problem? Write it, show how.
2. Did anyone solve it another way? How? What did you notice that is different about that way than your way?
3. Tell us about what was going through your mind when you were working on this (any) problem.
4. Answer your own questions about this (any) problem.
5. How were you taught to work this problem?

About the case studies (in general)

1. What kind of learning community did you notice the teacher creating? How?

2. What do you notice about the teacher's role?

3. Think about the strategies students use.

4. What are the mathematical practice(s) you notice?

5. How would you record what each student thinks in the number talk in the case?

About the readings

1. What surprised you?

2. What questions came up during your reading?

3. How is what you read different than how you were taught math?

4. Synthesize your learning this week - either here (interaction notebook) or online (online interaction notebook)

About your reactions to learning to teach math

5. How do you feel about what you are learning?

6. How would you say you feel about math right now?

APPENDIX D
Number Talks

Rubric for Number Talks: Questions to ask - taken from Parrish, *Number Talks*

For self-and peer-evaluation, rate yourself (or your peers) on a 1-5 scale, 1 = not very effectively and 5 = effectively demonstrated

Teacher's role

1. How does the teacher build student fluency with small numbers?
2. Are 10-frames used? How?
3. What questions does the teacher pose to build understanding? What other role do the teacher's questions play in building students' number sense?
4. What instructional strategies does the teacher use?
5. What opportunities are created for the students to begin building an understanding of ten? of composing and decomposing numbers?
6. What tools and models are used? How are the tools and models used to support the goals of K-2 number talks?
7. How does the teacher support student communication?
8. How does the teacher record each strategy to provide access for the class?
9. What math concepts or ideas are addressed? How does the teacher bring these to the forefront for the class? What practice standards are being used?

Student engagement and understanding

10. What strategies are participants (students) using to build meaning of the numbers?
11. What mathematical understandings and misconceptions are being addressed? What can the teacher learn from the students' responses and understandings?

For your reflection on content and practice standards

12. What examples of subtilizing, conserving number, one-to-one correspondence, composing and decomposing numbers, do you notice?
13. What strategies are easiest for you to understand? Which are more challenging?