Course Number:	CTEC 3020
Course Title:	Primary Math and Science
Credit Hours:	3 semester hours
Prerequisites:	Admission to Early Childhood Teacher Education
Co-requisites:	None

Instructor:	Angela Love, Ph.D., Early Childhood Education Program Coordinator
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Office Hours:	Tues. 12noon – 3 p.m., Wed. 9 a.m. – noon, and by appointment

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

Required Text:

You are required as one of your texts to join NAEYC as a member of this class:

National Association for the Education of Young Children: http://www.naeyc.org

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.

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.

Larson, M. R., Fennell, F., Adams, T. L., Dixon, J. K., Kobett, B. M., & Wray, J. A. (2012). *Common core mathematics in a PLC at work: Grades K-2.* Bloomington, IN: Solution Tree and Washington, D. C.: The National Council of Teachers of Mathematics, Inc.

Nemeth, K. N. (2012). *Basics of supporting dual language learners: An introduction for educators of children from birth through age 8.* Washington, D. C.: National Association for the Education of Young Children (NAEYC).

Recommended Texts:
Kamii, C., & Housman, L. B. (2000). *Young children reinvent arithmetic: Implications of Piaget's theory* (2nd Ed.). New York, NY: Teachers College Press

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

Smith, S. S. (2013). *Early childhood mathematics* (5th Ed.). Boston: Pearson.

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).

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)

USEFUL WEBSITES
You are required to join NAEYC as a member of this course; you will otherwise be asked to go to these other websites for resources to complete other assignments
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

AUBURN COLLEGE OF EDUCATION-CONCEPTUAL FRAMEWORK

Competent

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.

Committed

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, Reflections, & Weekly observations (30 Points):** Teacher candidates will maintain a notebook that references math lessons modeled in class and the Domains from the Alabama Course of Study that they address.

2. **Weekly observations (30 points):** Teacher candidates will participate in a weekly classroom experience at the Auburn Montessori School: The Children's House (231 East Drake Ave., Auburn, Alabama 36830); (334) 740-6192. A schedule will be posted and you may sign up for one of the hours each week that meets your schedule.

3. **Math Game/Lesson Plan (30 points):** Develop lesson plans for 3 math games – 1 board game (10 extra points if this game is of your own making – criteria for the extra points will be discussed in class), 1 card or sorting game, and 1 puzzler – reflecting at least one of the Domains of the 2010 Alabama Course of Study and one of the Common Core State Standards. These lesson plans will go into your notebook and the best of your lessons/games will be presented in class. Criteria will be posted on Canvas.

4. **Mathematics observation and analysis (50 points):** This assignment has two parts, two separate observations. **Part 1** – Observe in the Montessori School how children learn math. Write in detail what tasks you observe, what the child you observed accomplished, and reflect on the standards we are learning in relation to what you observed. Have a conversation afterward (after you have thought about the knowledge the child is building) with the teacher to find out what the goals of the task were. Write in your observation notebook what your thinking is compared to what the teacher's response was to your questions. **Part 2** – Choose one child to observe over a period of time, a minimum of **four** observations (5-10 min. each), during tasks that address mathematical thinking. Describe the tasks, describe the sequence of observations, connect the observations to the standards (ALEX and CCSS), and reflect on what you learned from the longitudinal study of one child's developing sense of number, geometry, relationships, patterns, etc. Connect directly to the texts/articles/resources we are reading and discussing in class and on Canvas.

5. **Physical Knowledge observation (25 points):** Observe two children playing in a natural setting exploring physical knowledge. Include the transcript from this event, and analyze the social interaction as well as the learning each of the children gained. Explain how you assessed the learning you observed, and which Alabama Course of Study and Common Core State Standards you attributed to this event.

6. **Midterm Exam (20 Points)**

7. **Final Exam (20 Points)**

8. **Participation and Professional Behavior (20 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 20 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 20 points allotted for this course requirement.

GRADES

Requirements and Points	Grades
➢ Math Journal/Notebook of Lessons, Ideas, Reflections, & Weekly observations (30 points) ➢ Weekly observation (30 points) ➢ Math game/lesson plan (30 points) ➢ Mathematics observation & analysis/presentation (50 points) ➢ Physical Knowledge observation (25 points) ➢ Class Participation and Professional Behavior (20 points) ➢ 2 Exams (20 points per exam) <u>Total</u>: 205 points	A = 205-185 points B = 184- 164 points C = 163-144 points D = 143-123 points F = 122 - 0 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 all students
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.

Reading Assignments/Assignment Due Dates

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.

Dates	Topic	Reading/ Assignments (Due)
8/20	Course Introduction; Community Building Activities	Syllabus
8/27	Overview of How Children Learn, Three Types of Knowledge, Piagetian Stages of Development, Dual Language Learners, Parent Involvement	• Meet at Auburn Montessori: The Children's House @ 231 E. Drake Ave, Auburn, (334) 740-6192 • Purchase notebook for Lesson Correlations and composition notebook for math journal. • Be sure to go to Canvas and complete Module 1 (all directions on Canvas) • Read Part 1 *Understanding Dual Language Learners* text
9/10	Overview of 2010 Alabama Course of Study for Mathematics; Establish Notebook for Lesson Correlations to the Course of Study;	• Print a Copy of 2010 Alabama Course of Study for Mathematics through Grade 3. Bring to class each night hereafter.

	Representation and The Importance of Social Interaction; Language of Math (songs, chants, literature, NCTM Process Standards, symbolic representation)	• Read Larson et al's *Common Core Math* CHPT 1 & Appendix C, D, E • Articles handout (in class)
9/17	One to One Correspondence and Number Sense and Counting	• Read Larson et al's *Common Core Math* CHPT 2 • Read NCTM's *Number & Numeration* CH 1 • Articles TBA
9/24	One to One Correspondence and Number Sense and Counting Continued; Logic and Classifying (matching, classification, comparing, order & seriation) Review for Midterm	• Read Larson et al's *Common Core Math* CHPT 3 • Read NCTM's *Number & Numeration* CH 2-3 • Articles TBA
10/1	**Midterm Exam *** ***10/5 is last day** to withdraw from the course with no grade penalty. "W" assigned.	
10/8	Patterns & Functions; Concepts Algebra; Operations on Whole Numbers	**Math Journals/Observation Notebook Due (check)** • Read Larson et al's *Common Core Math* CHPT 4 • Read NCTM's *Addition & Subtraction* CH 1-2 • Articles TBA
10/15	Operations on Whole Numbers/ Place Value	**Math Games/lessons Due** • Read Larson et al's *Common Core Math* CHPT 5 • Read NCTM's *Addition & Subtraction* CH 3 • Articles TBA
10/22	Measurement/ Data, Graphing & Probability	**Best Math Game/lesson presented** • Read Larson et al's *Common Core Math* CHPT 5 • Articles TBA
10/29	Geometry: Shapes & Spaces	**Math Observation and Analysis Due** Articles TBA
11/5	Fractions; Multiplicative Reasoning	Articles TBA
11/12	Basics of Science Instruction; Science Process Skills; Physical Science	**Math Journals/ Observation Notebook Due** Articles TBA
11/26	Instructor at State AMSTI Meeting Guest Speaker to be Announced	**Physical Knowledge observation Due**
*12/3-12/7	*Final Exam as Scheduled by University	