

**Primary Math and Science  
CTEC 3020  
Auburn University – Spring 2014**

**Instructor:** Dr. Sean Durham, Assistant Professor, Curriculum and Teaching  
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**Course Description:**

Exploration of learning and pedagogy for the development of math and science concepts appropriate for children in pre-kindergarten through grade 3.

**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**

**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.

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

**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.

Copley, J. V. (2000). *The young child and mathematics*. Washington, D.C.: The National Association for the Education of Young Children.

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.

*Focus in grades pk-2: Teaching with curriculum focal points* (2009). Reston, VA: The National Council of Teachers of Mathematics.

Kamii, C., & Housman, L. B. (2000). *Young children reinvent arithmetic: Implications of Piaget's theory* (2<sup>nd</sup> 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.

**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>

Alabama Math, Science, and Technology Initiative: <http://www.amsti.org>

Alabama State Department of Education: <http://www.alsde.org>

### Course Requirements:

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

1. **Weekly observations (15 points):** Teacher candidates will participate in a weekly one-hour classroom experience facilitated by the instructor at a local school for young children. Participation will be chronicled in a journal format and will be used for the completion of course projects. More information will be provided in class. Students will have the opportunity to schedule observations that meet their schedule in accordance with time slots offered by the individual programs.
2. **Math game/lesson Plan (15 points):** Develop lesson plans and materials for 3 math games – 1 board game 1 card or sorting game, and 1 puzzler – aligned to appropriate early learning standards. Your lessons/games will be presented in class. Further instructions will be provided in class.
3. **Mathematics observation and analysis (20 points):** This assignment has two parts, two separate observations. **Part 1** – Observe in the your school setting opportunities children have encountered that support mathematical thinking. Write in detail what tasks you observe, what the child you observed accomplished, and connect your observation to course readings and early learning standards. 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 (e.g., 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.
4. **Math in early education paper (Mid-term) (15 points):** This paper will allow you to synthesize your knowledge and experiences to address the development of mathematical thinking in young children. You will combine journal entries, observations, readings, and learning standards will serve as the reference for your analysis.
5. **Connecting young children to nature project (10 points):** Students will develop a scrapbook (may be electronic, e.g. Pinterest) of at least 10 opportunities (ideas) that can be used promote scientific thinking in children through experiences outdoors. Students will thoroughly describe each situation, provide illustrations, and describe the relationship to Next Generation Science Standards.
6. **Physical knowledge experience and documentation (15 points):** Develop a physical knowledge activity according to constructivist

principles. Include a written “lesson plan” and collect information about children’s experience and understanding of physical knowledge relationships. Additional information will be provided in class.

7. **Participation and professional behavior (10 Points):** All students are required to attend all classes and scheduled observations, 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.)

#### **Grading:**

<b>A</b>	<b>90-100</b>
<b>B</b>	<b>80-89</b>
<b>C</b>	<b>70-79</b>
<b>F</b>	<b>69 and Below</b>

#### **Class Policy Statements:**

*Cell Phones:* Turn off cellular phones and other electronic devices in class unless otherwise given permission by the instructor. Please give the C & T office number to anyone who may need to reach you during class hours in the event of an emergency (334.844.4434).

*Participation:* Students are expected to participate in all class discussions and participate in all exercises including educational observations in the field. It is the student’s responsibility to contact the instructor if assignment deadlines are not met. A 5- point penalty will be assigned for any assignment turned in late. Students are responsible for initiating arrangements for missed work.

*Absences:* Students are granted excused absences from class for the following reasons: Illness of the student or serious illness of a member of the student’s immediate family, the death of a member of the student’s immediate family, trips for student organizations sponsored by an academic unit, trips for University classes, trips for participation in intercollegiate athletic events, subpoena for a court appearance, and religious holidays. Students who wish to have an excused absence from this class for any other reason must contact the instructor in advance of the absence to request permission. The instructor will weigh the merits of the request and render a decision.

When feasible, the student must notify the instructor prior to the occurrence of any excused absences, but in no case shall such notification occur more than one week after the absence. Appropriate documentation for all excused

absences is required. Please see the Student Policy eHandbook for more information on excused absences.

*Make-up policy:* Arrangements to make up missed major examinations (e.g. hour exams, mid-term exams) due to properly authorized excused absences must be initiated by the student within one week from the end of the period of the excused absences. Except in unusual circumstances, such as continued absence of the student or the advent of University holidays, a make-up exam will take place within two weeks from the time that the student initiates arrangements for it. Except in extraordinary circumstances, no make-up exams will be arranged during the last three days before the final exam period begins. The format of the make-up exam will be specified by the instructor.

*Email Responses:* Email is a preferred form of communication. However, students should not expect that communication with the instructor has occurred the moment an email is sent. Students can generally expect a reply within 24 hours. If a student does not receive a reply after 24 – 48 hours, a second email is appropriate.

*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).

*Honesty Code:* All portions of the Auburn University student academic honesty code (Title XII) found in the Student Policy eHandbook will apply to this class. All academic honesty violations or alleged violations of the SGA Code of Laws will be reported to the Office of the Provost, which will then refer the case to the Academic Honesty Committee. The URL for the eHandbook is [www.auburn.edu/studentpolicies](http://www.auburn.edu/studentpolicies).