AUBURN UNIVERSITY
SYLLABUS

1. **Course Number:** CTSE 7900
   Course Title: Independent Study: Algebraic Reasoning and Sense Making
   Credit Hours: 2
   Prerequisites: Departmental Approval
   Co-requisites: None

2. **Date Syllabus Prepared:** August 3, 2009

3. **Texts:**
   Driscoll, M. (1999). *Fostering algebraic thinking: A guide for teachers, grades 6-10.* Portsmouth, NH: Heinemann.
   Edwards, E. L., Jr. (Ed.) (1990). *Algebra for everyone.* Reston, VA: National Council of Teachers of Mathematics.
   Graham, K., Cuoco, A., & Zimmermann, G. (2010). *Focus in High School Mathematics: Reasoning and Sense Making in Algebra*. Reston, VA: National Council of Teachers of Mathematics.
   Moses, R. P., & Cobb, C. E. (2001). *Radical equations: Math literacy and civil rights.* Boston, MA: Beacon Press.
   Other Resources (journals, research monographs, unpublished research, etc.) will also be used.

4. **Course Description:**
   This course is designed to provide the student with the opportunity to read about theories and strategies related to algebraic reasoning and sense making and apply them to her classroom.

5. **Course Objectives:**
   The goal of this course is to provide teachers the opportunities to:
   1. Learn of effective strategies related to teaching algebra and apply them in a classroom setting.
   2. Study and understand misconceptions that students have related to algebra.
   3. Assess student's algebraic reasoning and sense making skills.

6. **Course Content and Schedule:**

Date	Event
8/17/2011	Introduction to the Course
8/31/2011	Discuss the following chapters: Chazan, D. & Yerusshalary, M. (2003). On appreciating the cognitive complexity of school algebra: Research on algebra learning and directions of curricular change. In J. Kilpatrick, W. G. Martin, &, D. Schifter (Eds.) *A Research Companion to Principles and Standards for School Mathematics* (pp. 123 - 135). Reston, VA: National Council of Teachers of Mathematics. Smith, E. (2003). Stasis and change: Integrating patterns, functions, and algebra throughout the K-12 curriculum. In J. Kilpatrick, W. G. Martin, &, D. Schifter (Eds.) *A Research Companion to Principles and Standards for School Mathematics* (pp. 136 – 150). Reston, VA: National Council of Teachers of Mathematics.

	Article Summaries are due.
Week of 9/7/2011	Discuss: Edwards, E. L., Jr. (Ed.) (1990). *Algebra for everyone.* Reston, VA: National Council of Teachers of Mathematics. **Article Summary is due.**
Week of 9/21/2011	Discuss Chapters 1 & 2 of Graham, K., Cuoco, A., & Zimmermann, G. (2010). *Focus in High School Mathematics: Reasoning and Sense Making in Algebra*. Reston, VA: National Council of Teachers of Mathematics. **Article Summary is due.**
9/28/2011	Discuss Chapter 3 of Graham, K., Cuoco, A., & Zimmermann, G. (2010). *Focus in High School Mathematics: Reasoning and Sense Making in Algebra*. Reston, VA: National Council of Teachers of Mathematics. **Article Summary is due.**
10/10/2011	Moses, R. P., & Cobb, C. E. (2001). *Radical equations: Math literacy and civil rights.* Boston, MA: Beacon Press. (Read Pedagogy The Experience of Teachers and Students). **Article Summary is due.**
10/17/2011	**Lesson Observation and Debriefing**
11/2/2011	**Issue Brief I is due.**
11/16/2011	**Issue Brief II is due.**
11/21-25/2011	**Thanksgiving Break**
11/30/2011	**Lesson Observation and Debriefing**
12/2/2011	**Reflection of Lessons Learned is due.**

7. Course Requirements/Evaluation:

Descriptions of Major Assignments

Summary of Reading

Prior to each class meeting, the student will be required to write a reflection related to a specific article or chapter that she read for homework. Below are questions that should be answered:

1. For each article or chapter, the students will write a three-page reflection. She will use the APA Manual of Style as a reference as to how to reference the articles. Below is the information that students should include in the summary:
    a. Discuss the major points of the article or chapter.
    b. Important terms
    c. Theoretical basis if there is one
    d. Major implications for mathematics education
    e. How it relates to other assigned readings
    f. Discuss questions that arose in your mind as you read the article.
    g. References

Lesson Plans and Reflections Related to Field-based Experiences

I will observe the student teaching two lessons throughout the semester and we will debrief following the lesson. The lessons will be written based on the strategies that the student is learning from the course. She will also reflect on each experience. Guides will be provided with specific questions to answer regarding the experience.

Issue Briefs

You will prepare two issue briefs (four to six pages each). The first issue brief should focus on discourse in the mathematics classroom that will foster algebraic reasoning and sense making. The second issue brief should focus on the importance of teachers having both pedagogical knowledge and content knowledge related to algebra. In each brief, you must:

1. Define the issue in mathematics education
2. Describe advantages and disadvantages of two or more suggested responses (or approaches); i.e., summarize major arguments,
3. State and defend your personal view,
4. Include, in APA format, a list of at least 5-8 key references.

Papers are assessed on quality of ideas, quality of writing, adherence to APA format, use of key sources, integration of ideas from other readings, class discussions, etc. You will discuss your paper in class.

Written Report on the Entire Experience

You will write a report of your overall experience throughout the course. You should discuss major lessons learned about the teaching and learning of algebra.

8. Evaluation and Course Grading:

Grades will be based on level and quality of class and written work. Each written assignment will be reviewed and feedback given for revision where desired. **All assignments must be typewritten and double-spaced. Use size 12-font. Use APA Manual Style for references.** Points will be deducted from assignments for grammatical mistakes, typos, and spelling errors. The assignments will be graded on a point scale as follows:

Course Requirements and Assignments

Assignment	Points
Article Summaries (7@10)	70
Lesson Plans and Debriefing Reflections 2@50	100
Issue Briefs 2@50	100
Written Report on the Entire Experience	100
Total	**370**

Evaluation

Final course grades will be assigned based on the percentage of possible points earned by students.

A	90% or above
B	80 % - 89%
C	70% - 79%
D	0% - 69%

Attendance: You are expected to attend all classes as scheduled.

Academic Honesty: All portions of the Auburn University Honesty Code (Title 1208) found in the Tiger Cub will apply in this class.

Accommodations for Students with Special Needs: Students who need special accommodations should make an appointment to discuss the Accommodation Memo during my office hours as soon as possible. If scheduled office-hours conflict with your classes, please arrange an alternate appointment time. If you do not have an Accommodation Memo, but need special accommodations, contact the Program for Students with Disabilities in 1244 Haley Center (844-2096 V/TTY).

9. Class Policy Statements

Participation: Students are expected to participate in all class discussions and in all exercises. Texts will be heavily used in class. BRING TEXT EACH DAY. Assignments are due on announced dates. Unexcused late assignments are unacceptable. Students are responsible for initiating arrangements for missed work due to excused absences as outlined in the *Tiger Cub*.

Attendance/Absences: Attendance is required. Please be on time. Those with more than one unexcused absence can receive no more that a "D" for the course. Three unexcused tardies are the equivalent of an absence. E-mail or phone and leave a message at my office number above if you are going to miss class. If an exam is missed, a make-up exam will be given only for University-approved excuses as outlined in the *Tiger Cub*. Arrangement to take a 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 excused absences from campus must be documented and cleared with the instructor **in advance.**

Accommodations: Students who need accommodations are asked to arrange a meeting during office hours the first week of class or as soon as possible if accommodations are needed immediately. If you have a conflict with my office hours, an alternative time can be arranged. To set up this meeting, please contact me by e-mail. Bring a copy of your Accommodation Memo and an Instructor Verification Form to the meeting. If you do not have an Accommodation Memo, but need accommodations, make an appointment with The Program for Students with Disabilities in 1244 Haley Center as soon as possible. Telephone: 334-844-2096 (V/TT).

Honesty Code: The Auburn University Academic Honesty Code and the *Tiger Cub* Rules and regulations pertaining to Cheating and Plagiarism will apply to this class.

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

- Engage in responsible and ethical professional practices
- Contribute to collaborative learning communities
- Demonstrate a commitment to diversity
- Model and nurture intellectual vitality

10. Justification for Graduate Credit

This course will allow individual graduate students to pursue in-depth study of advanced topics within their respective areas of specialization, usually in a school setting. Although guided by the professor at periodic checkpoints, the course requires independent work of the student to design, develop, and produce a product for presentation and evaluation.

11. Other Resources

Chappelle, M. F., & Strutchens, M. E. (2001). Creating connections: Promoting algebraic thinking with concrete models, *Mathematics Teaching in the Middle School*, *7*(1), 20-25.

Coxford, A. F., Shulte, A. P. (Eds.) (1988). *The ideas of algebra, K-12. 1988 yearbook*. Reston, VA: National Council of Teachers of Mathematics.

Heid, M. K., & Edwards, M. T. (2001). Computer algebra systems: Revolution or retrofit for today's mathematics classroom? *Theory into Practice, 40* (2), 128 – 136.

Silver, E. A., & Kenney, P. A. (Eds.). (2000). *Results from the seventh mathematics assessment of the National Assessment of Educational Progress*. Reston, VA: National Council of Teachers of Mathematics.

Usiskin, Z. (1980). What should not be in the algebra and geometry curricula of average college-bound students? *Mathematics Teacher*, *73*(6), 413 - 424.