



AEDU N635J Algebra for Middle School Mathematics Teachers

Spring 2009

CourseCompass Course ID: reid38921

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I. Descriptive Information

- A. Catalog Description: A course in the teaching and learning of algebra and its implications for the middle school classrooms. Topics include a study of linear, quadratic, exponential and other functions, their symbolic, graphical and numerical representations, and their applications. Also included are solutions to equations, inequalities, and systems of equations, and a focus on using technology and collaboration in problem-solving. Special attention will be given to incorporating current mathematical standards in content and pedagogy. 3 credit hours.
- B. Prerequisites: A student must have a thorough understanding of elementary algebra concepts and a working knowledge of the TI 83 or 84 graphing calculator.
- C. Most assignments will include electronically submitted homework using CourseCompass (MyMathLab) and written out solutions. You may feel free to discuss and collaborate with one another on homework. Tests, however, are submitted with the USCA honor code that "I have neither given nor received help on this quiz.", followed by your signature.

II. Course Goals and Objectives

A. Course Goals

The goal of the course is for participants to have a thorough understanding of algebra concepts so that they may have a better sense of the content and pedagogy needed for middle school mathematics. Using activities that (1) encourage collaboration, (2) enhance communication skills and problem solving skills, and (3) effectively use technology, the course will not only address mathematical content but will also serve as a model for teaching mathematics.

B. Instructional Objectives

Upon completion of this course participants will:

1. have a thorough understanding of the concepts in algebra needed in more advanced mathematics courses, namely functions and their applications, and methods of solving equations and inequalities.
2. be able to solve problems in terms of functions and functional notation approached from symbolic, numeric and graphical perspectives.
3. be able to solve word problems.
4. use additional tools and activities that they can apply in their middle mathematics classrooms.

5. be more confident in using technology and real world data in their mathematics classrooms.
6. be able to communicate better in mathematics using mathematical terminology, symbols, graphs, and tables.
7. stimulate students to become critical readers of quantitative arguments

III. Course Materials

Required materials:

- Text: Gary Rockswold, *College Algebra through Modeling and Visualization*, 3rd edition, Addison-Wesley 2006 ISBN: 0-321-27908-5
- DVD Set: *Algebra for Middle School Teachers DVD Set*, USC Aiken 2008
- Required: Graphing calculator (TI-73, TI-83/84, TI-nSpire)
The DVD primarily focuses on using the TI-73, which is most commonly available in middle-grade classrooms.
- A personal computer running Microsoft Windows (XP or Vista). You will need to be able to install add-ins to Microsoft Internet Explorer so that you can access CourseCompass and MyMathLab - the on-line homework component of the course.

Recommended materials:

- *Navigating Through Algebra: 6-8*, NCTM (Not provided but a book you may want to get for your own classrooms.)
- Mildred Johnson, Tim Johnson, *How to Solve Word Problems in Algebra*, 2nd edition, McGraw-Hill, 2000, ISBN: 0-07-134307-5 (Again, not provided. However, you can get this on Amazon pretty cheaply. It is a very good book for learning to solve word problems.)
- A loose-leaf notebook with sections for journal writing, directed writing, study notes, homework, and the lesson plan. (You may want to do this electronically in Word documents instead of a physical binder.)
- CBL-2. This is demonstrated on one of the DVD's and a good addition to your own classroom.
- Algebra Tiles. This, too, is demonstrated on one of the DVD's.

IV. Instructional Procedures

- The general rule of thumb for hours spent on college course is three hours outside class for each credit hour. That amounts to $45 \times (3+1) = 180$ hours over the length of the course.
- Students are expected to (1) watch the relevant sections of the DVD set, and (2) carefully read their textbooks. Each DVD is spent partly on presenting new material and partly on answering questions posed by the students from the video class. As you prepare for each assignment by reading the text and watching the DVD, note any questions you have about the topic, and ask those questions on the CourseCompass discussion board. Your section mentor will contact you to let you know the best way to reach them. I will check email daily, but will respond most quickly during weekday work hours.
- The goal of the on-line (MyMathLab) homework is to enhance the student's understanding of mathematical concepts. You can treat the due dates as a suggested timeline for going through the material (i.e., you can keep working on it past the due date), but you must **complete the homework prior to the corresponding exam**. These homework assignments may take a considerable amount of time, so keep up! I highly

recommend that you work together in groups to understand the concepts. You may use your notes and text in working their homework assignments. You should copy down and then solve the problems by hand, and keep your solutions together in a homework notebook. This collection of worked-out problems will be extremely helpful when studying for an exam.

Caution: the one "drawback" to the MyMathLab platform is the built-in help. In general, clicking the "View an Example" or "Help Me Solve This" is a great way to reinforce concepts that you see in the DVD and text. However, it may keep you from learning the crucial problem-solving step of coming up with a plan to solve the problem. So if you use these features on a given problem, make a note to go back to that problem a day or so later and try reworking it without using those buttons.

- The Learning Guide for each module details the DVD segments, homework, and readings.
- I will assign a few "pedagogical problem sets" for you to work out fully, **showing all the steps** that you would use to illustrate the solution to a student in your class. Be sure to correctly label any graphs that you use, at a minimum showing scale values on the horizontal and vertical axes. These assignments will be electronically submitted (scan your handwritten homework to a Word document, then upload to the CourseCompass assignment). Each assignment will due by a given date, and will be graded based on completeness of the shown work, accuracy, thoughtfulness and thoroughness. These problem sets will make up the bulk of your homework portfolio.
- For each "Self-Assessment Quiz" on the DVDs, you should (1) print out the quiz (available for download via CourseCompass); (2) work the quiz; (3) self-grade the quiz as if you were grading one of your students, giving appropriate feedback; and (4) submit (i.e., scan and upload to CourseCompass assignment) the marked-up quiz. Points for these self-check quizzes are based on the appropriateness of the feedback.
- Students are invited to participate in class "discussions" with one another via the CourseCompass discussion board, especially with questions about the mathematics content and the pedagogical methods. Bonus points will be awarded both for posting good questions and for insightful responses.
- Individual or group help is ALWAYS available to you by contacting me by email, phone, or by arranging a mutually convenient time. If I think the discussion would benefit the class, though, I may ask that we have the discussion via the CourseCompass discussion board.

V. Course Requirements, Evaluation and Grading Scale

- Homework, readings and collaborative projects are assigned via CourseCompass.
- You should have a reflections journal entry for each DVD segment and each self-assessment quiz. A sample reflection entry is available via CourseCompass.
- The homework portfolio will be composed primarily of your pedagogical problem sets.
- Students will be expected to collaboratively design and develop one model lesson in written format. (Sample model lesson is available via CourseCompass.)
- **Late Assignments: The self-assessment quiz and pedagogical problem set assignments will not be accepted after their due date.** You may, however, go back and improve you MyMathLab homework scores prior to the end of the course.
- Your final grade in this course will be determined by:

MyMathLab Homework/Quizzes	20%
Pedagogical Problem Sets/Self-check Quizzes	20%
Model Lesson Plan	10%

Midterm Exam (USCA or USCB, April 10) 25%

Final Exam (USCA or USCB, May 29) 25%

- The grading scale for the course is as follows:
100 ≥ A ≥ 90 > B+ ≥ 87 > B ≥ 80 > C+ ≥ 77 > C ≥ 70 > D ≥ 65 > F
(Example: a score of 88 would be a "B+" since it is less than 90 but greater than or equal to 87.)

VI. Other requirements

1. Class Participation Participants are expected to participate fully in any CourseCompass discussions. You are responsible for checking the CourseCompass web page and discussion board at least every other day. Bonus points will be awarded both for posting good questions and for insightful responses. If you anticipate a period of time for which you will be unable to participate", notify the instructor in advance. Participants will sign the USCA HONOR PLEDGE on all graded academic work certifying that no unauthorized assistance has been given or received in the completion of the work.
2. USCA Code of Conduct: Candidates will conduct themselves in exams in accordance with the standards noted in the USCA Student Handbook.
 - Please switch all cell phones and pagers to a non-audio mode during exams.
 - Please do not bring children or guests to exams unless prior permission has been given by the professor.
3. Participants with a physical, psychological, and/or learning disability which might affect their performance in this class must contact the Office of Disability Services, 126A B&E, (803) 641-3609, as soon as possible. The Disability Services Office will determine appropriate accommodations based on medical documentation.

Suggested Schedule
(Exams will be proctored at USC Aiken or USC Beaufort)

Date	DVD	Section (Rockswald, College Algebra with Visualization)	Module
Mid Feb	(Course intro; pre-test)		
	1.a, 1.b, 2.q , 14.a;	1.1	1
	1.c, 1.d, 2.a, 2.b, 3.q	1.2, 1.3	
	2.c, 2.d	1.4	
	3.a, 14.b, 14.e		
	3.b, 3.c, 4.a, 5.b	2.1, Appendix AP-10, 2.2, 2.3	2
	4.q	2.4	
	4.b, 4.c, 5.q , 5.a, 6.q	2.5	
	14.d, 14.f, 14.h		
	6.a, 6.b, 5.b	3.1, 3.2, 3.4	3
	7.b, 8.a		
	10.a, 10.q	4.1	4
	10.b	4.2	
Apr 10	(Midterm Exam)		
	10.c, 11.q	4.3, 4.4	
	11.a, 12.q	4.5	
	14.c, 11.b		
	7.a, 8.q,	5.1	5
	8.b, 9.a, 9.b	5.3	
	8.c, 9.q	5.2	
	14.g, 12.b		
	12.a, 13.q, 13.b	6.1, 6.2	6
	14.h		
May 29	(Post-Test; Final Exam)		

Note: Numbers under the DVD column indicate the disk and segment to watch. For example, “1.a” refers to segment a on Disk 1, while “2.q” refers to segment q (the self-check quiz) on Disk 2.