

# Sample Syllabus

## *Face 2 Face*

**Algebra Academy – Part I**  
**EDU 508 — 3 credit hours**

### **Course description: Algebra Academy — Part 1**

#### **Course Description:**

Designed for mathematics teachers of Algebra I, this course has as its focus enhanced teacher mathematical knowledge for Michigan Algebra I content expectations and facilitated study of the strategies, materials, technology, and current research used in the effective teaching of algebraic concepts to high school students.

The purpose of this course is to develop competencies in effectively teaching Michigan High School Content Expectations for Algebra I to all students. It is predicated upon a student-centered, function based approach to teaching Algebra I. Many of the best practice strategies used in this course are not exclusive to teaching mathematics and can be used in all subject areas.

#### **Prerequisites:**

None

#### **Course Goals:**

1. Enhance teacher mathematical content knowledge of Michigan Algebra I High School Content Expectations.
2. Increase teacher capacity to differentiate mathematical learning through the use of technology and implementation of a functions-based instructional approach, for Algebra
3. Increase teacher assessment literacy and the role balanced assessment plays in improved student learning.

#### **Learning Objectives:**

Learners will

- o Demonstrate mathematical content knowledge for Michigan Algebra I high school content expectations through a functions-based perspective.
- o Participate in threaded discussions via Blackboard reflecting on Internet research concerning best practices in mathematics instruction.
- o Evaluate, modify, and create curriculum materials and lessons that promote student understanding of essential Algebra I concepts.
- o Design and implement curriculum materials and lessons that differentiate mathematical learning for diverse Algebra I students.
- o Integrate technology into Algebra I curriculum and learning activities.
- o Develop and implement appropriate assessment procedures and tools for use prior to and after instruction, which monitor student understanding of Algebra I.

#### **Required Materials:**

Van Dyke, Frances. *A Visual Approach to Functions*. Km: Curriculum Press. 2002.

**Course Requirements:**

1. Prepare and present a model differentiated Algebra I mathematics lesson linked to Michigan HSCEs.
2. Complete readings in preparation for discussion (*A Visual Approach to Functions*).
3. Knowledgeably discuss issues of current mathematics research and reform.
4. Complete online research concerning the best practices in mathematics instruction.

**General Methodology**

Due to the nature, philosophy, and goals of the course, attendance is essential. The following methodologies will be used:

- Group discussion and analysis
- In-class presentations and demonstrations
- Use of technology during and outside of class
- Online readings and threaded discussions
- Assigned readings and reflections
- Writing, analysis and revision of curriculum materials

**Evaluation Criteria:**

The course grade will be a letter grade, minimum for an A is 90%. a B is 80%, a C is 70%, a D is 60%, and below is failing.

The grade will be broken down in this manner:

1. Determined by the presentation of a model differentiated Algebra I mathematics lesson linked to Michigan HSCEs. 20%

Exemplary Performance	Average Performance	Low	Not acceptable	Earned Points
Presentation with bibliography and handouts that is relevant and insightful, incorporating appropriate differentiation strategies, technology, and assessment  20 points possible	Presentation with bibliography and handouts that is relevant and shows insight but may demonstrate a weak incorporation of appropriate differentiation strategies, technology, and/or assessment  15-19 points possible	Presentation with bibliography and handouts that is lacking in relevancy, insight, and/or adequate incorporation of appropriate differentiation strategies, technology, and assessment  10-14 points possible	Incomplete lesson  0-9 points possible	

2. Determined by analysis of a lesson in each chapter of *A Visual Approach to Functions*.

30%

Objectives	Exemplary Performance	Average	Low	Not acceptable	Earned Points
Analysis of each lesson will include: <ul style="list-style-type: none"> <li>✓ High School Content Expectations (HSCE) covered</li> <li>✓ Analysis of technology incorporated — including barriers</li> <li>✓ Alternate component for struggling learners</li> <li>✓ Assessment component</li> </ul> 30 points possible.	Quality analysis completed for all 6 lessons.  (26-30 points)	Quality analysis completed for 4-5 lessons.  (16-25 points)	Quality analysis completed for 2-3 lessons.  (10-15 points)	Analysis of lessons did not meet course expectations.  (0-9 points)	

3. Completion of written reaction paper based on current professional article related to effectively teaching mathematics at the secondary school level.

20%

Students will write a reaction paper where the first paragraph provides a brief overview of the article. Following paragraphs address the participant's reactions to the author's comments. The final paragraph contains connections on how the article impacts and/or has implications for the implementation of teaching mathematics in your classroom. The article must be copied off and attached to the paper.

Objectives	Exemplary Performance	Average	Low	Earned Points
Students will write a reaction paper where the first paragraph provides a brief overview of the article. 5 points possible	Provides a clear and thorough introduction and overview of the article. (4 -5 points)	Provides an introduction and overview that is somewhat clear and thorough. (2-3 points)	Overview and introduction are not clear. (0-1 point)	
Paragraphs address the participant's reactions to the author's comments. 5 points possible	Provides strong convincing statements and reactions. (4-5 points)	Provides adequate statements and reactions. (2-3 points)	Reactions and statements are not clear or concise. (0-1 point)	
The final paragraph contains connections on how the article impacts and/or has implications for teaching mathematics in your classroom. 5 points possible	Clear concise evidence of how the article impacts the teaching of mathematics in your classroom. (4 -5 points)	Provides adequate information on how the article impacts the teaching mathematics in your classroom, (2 - 3 points)	Provides vague information on the impact of the article on the teaching of mathematics in your classroom. (0 - 1 point)	
Presentation of paper  5 points possible	Paper is typed_ uses acceptable style and grammar (no errors). (4 - 5 points)	Paper is typed and uses acceptable style and grammar (one error). (2 - 3 points)	Paper is not typed and/or fails to use acceptable style and grammar (two or more errors). (0 - 1 point)	

4. Completion of on-line assignments and threaded discussions. Students must complete all required online research, submission of written summaries and/or related assignments, participate in threaded discussions, and respond to the discussion comments of colleagues. **Ten hours (10 hours documented online time required).** 30%

Objectives	Exemplary Performance	Average	Low	Not Acceptable	Earned Points
1 Completion of on-line assignments and threaded discussions  30 points possible	All responses to written assignments and threaded discussions are complete and insightful.  (26-30 points)	Responses to written assignments and threaded discussions are adequate.  (21 -25 points)	Responses to written assignments and threaded discussions are vague.  (13-20 points)	Did not respond adequately to written assignments or threaded discussions.  (0-12 points)	

**Approved district designed professional development courses may not substitute for regularly designed courses in degree programs unless determined by the respective department.**

**Syllabus Prepared By:**  
Name, Title, District

**Course Outline**  
**EDU 508 – 3 credit hours**  
*Algebra Academy – Part I*

Session I  
8:00 – 3:00

**Function Based Approach to Algebra** **7 hours**

Essential Learning includes:

- Introduction to Function Based Algebra
  - What is a Functions Approach to Algebra?
  - Three Principles of How People Learn
  - Effective Strategies for Teaching Students with Difficulties in Mathematics
- Introduction to Types of Functions
- Multiple Representations of Functions
- Distinguishing Among Function Families

Session 2  
8:00 – 3:00

**Linear Functions** **7 hours**

Essential Learning includes:

- Linear Functions and Equations
- Solving Linear Functions Graphically and Algebraically
- Adding and Subtracting Lines
- Linear Functions in Context
- Alignment to MDE Algebra I
  - Analyzing Michigan Algebra I HSCEs
  - Analysis of Instructional Materials

Session 3  
8:00 – 3:00

**Quadratic Functions** **7 hours**

Essential Learning includes:

- Exploring Vertex and Standard Forms
- Modeling with CBR and Graphing Calculator
- Multiple Lines to Generate a Quadratic
- Looking at 1<sup>st</sup> and 2<sup>nd</sup> Differences
- Transformations of Quadratics
- Looking at Zeros and Connections to Factors
- Effects of Leading Coefficient
- Quadratic Functions in Context
- Alignment to MDE Algebra I
  - Analyzing Michigan Algebra I HSCEs
  - Effective Strategies for Teaching Students with Difficulties in Mathematics

Session 4  
8:00 – 3:00

### **Polynomial Functions**

**7 hours**

Essential Learning includes:

- Recognizing the Number of Zeros of Polynomial Functions
- Relationship between Linear Components and Zeros of the Function
- End Behavior for Polynomials
- Even or Odd Functions
- Effects of Leading Coefficient
- Relative Maximums and Minimums of Polynomials
- Multiple Representations of Polynomials
- Domain and Range of Polynomials
- Collecting Data Using Navigator
- Polynomial Functions in Context
- Alignment to MDE Algebra I
  - o Analyzing Michigan Algebra I HSCEs
  - o Five Key Strategies for Effective Formative Assessment

### **On-Line**

**10 hours**

Students must complete all required online research, submission of written summaries and/or related assignments, participate in threaded discussions, and respond to the discussion comments of colleagues. Ten hours (10) hours documented online time required.

**Total hours: 38 contact hours**

# Course References

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*Teaching Algebra Academy*

Van Dyke, Frances. *A Visual Approach to Functions*. Key Curriculum Press.  
2002

