Illinois Agricultural Education & FFA

Applied Mathematics in Agriculture

Advanced AMA -- Structures

Course Outline

Grade Level:	*Length of Course:*	*Credit:*	ISBE Code
11-12	*Year*	*1.0*	18403A003

Course Description: Advanced AMA--Structures is an integrated way to learn geometry through application in construction. The structural concepts within the course are organized to complement the skills and knowledge learned in geometry lessons. Students experience working days on a job site or technical project, as well as classroom experiences, focused on the development and review of geometric concepts. Students will collaborate to build projects from sawhorses and modular furniture to manufactured housing and tiny homes. The course will provide students the opportunity to immediately apply what they are learning about geometry to their projects and buildings. Participation in FFA student organization activities and Supervised Agricultural Experience (SAE) projects are an integral course component for leadership development, career exploration, and reinforcement of academic concepts.

**This suggested outline should be used as a guide and can be modified to fit the school situation in alignment with the program focus and the length of the course. A minimum of 60-70% of the lessons found in this outline should appear in the outline developed.*

Unit Title	Lesson Title	Resource & Code	Pace
TOOLS OF STRUCTURAL GEOMETRY	Nets and Drawings for Visualizing Geometry in Structures		10 hours
	Points, Lines, and Planes		
	Measuring Segments		
	Measuring Angles		
	Exploring Angle Pairs		
	Basic Constructions		
	Midpoint and Distance in the Coordinate Plane		

Unit Title	Lesson Title	Resource & Code	Pace
REASONING AND PROOF	Patterns and Inductive Reasoning		10 Hours

	Conditional Statements		
	Biconditionals and Definitions		
	Deductive Reasoning		
	Reasoning in Algebra and Geometry		
	Proving Angles Congruent		

Unit Title	Lesson Title	Resource & Code	Pace
PARALLEL AND PERPENDICULAR LINES	Lines and Angles		10 Hours
	Properties of Parallel Lines		
	Proving Lines Parallel		
	Parallel and Perpendicular Lines		
	Parallel Lines and Triangles		
	Constructing Parallel and Perpendicular Lines		
	Equations of Lines in the Coordinate Plane		
	Slopes of Parallel and Perpendicular Lines		

Unit Title	Lesson Title	Resource & Code	Pace
CONGRUENT TRIANGLES	Congruent Figures		25 Hours
	Triangle Congruence by SSS and SAS		
	Triangle Congruence by ASA and AAS		
	Using Corresponding Parts of Congruent Triangles		
	Congruence in Right Triangles		
	Congruence in Overlapping Triangles		

Unit Title	Lesson Title	Resource & Code	Pace
RELATIONSHIPS WITHIN TRIANGLES	Midsegments of Triangles		25 Hours
	Perpendicular and Angle Bisectors		
	Bisectors in Triangles		
	Medians and Altitudes		
	Indirect Proof		
	Inequalities in One Triangle		
	Inequalities in Two Triangles		

Unit Title	Lesson Title	Resource & Code	Pace
POLYGONS AND QUADRILATERALS	The Polygon Angle-Sum Theorems		5 Hours
	Properties of Parallelograms		
	Proving that a Quadrilateral is a Parallelogram		
	Properties of Rhombuses, Rectangles and Squares		
	Conditions for Rhombuses, Rectangles and Squares		
	Trapezoids and Kites		
	Polygons in the Coordinate Plane		
	Applying Coordinate Geometry		
	Proofs Using Coordinate Geometry		

Unit Title	Lesson Title	Resource & Code	Pace
SIMILARITY	Ratios and Proportions		5 Hours
	Similar Polygons		
	Proving Triangles Similar		
	Similarity in the Right Triangle		
	Proportions in Triangles		

Unit Title	Lesson Title	Resource & Code	Pace
RIGHT TRIANGLES AND TRIGONOMETRY	The Pythagorean Theorem and Its Converse		20 Hours
	Special Right Triangles		
	Trigonometry		
	Angles of Elevation and Depression		
	Laws of Sines		
	Laws of Cosines		

Unit Title	Lesson Title	Resource & Code	Pace
TRANSFORMATIONS	Translations		20 Hours
	Reflections		
	Rotations		
	Compositions of Isometries		
	Congruence Transformations		
	Dilations		
	Similarity Transformations		

Unit Title	Lesson Title	Resource & Code	Pace
AREA	Areas of Parallelograms and Triangles		15 Hours
	Areas of Trapezoids, Rhombuses, and Kites		
	Areas of Regular Polygons		
	Perimeters and Areas of Similar Figures		
	Trigonometry and Area		
	Circles and Arcs		
	Areas of Circles and Sectors		
	Geometric Probability		

Unit Title	Lesson Title	Resource & Code	Pace
SURFACE AREA AND VOLUME	Space Figures and Cross Sections		10 Hours
	Surface Areas of Prisms and Cylinders		
	Surface Areas of Pyramids and Cones		
	Volumes of Prisms and Cylinders		
	Volumes of Pyramids and Cones		
	Surface Areas of Volumes and Spheres		
	Areas and Volumes of Similar Solids		

Unit Title	Lesson Title	Resource & Code	Pace
CIRCLES	Tangent Lines		10 Hours
	Chords and Arcs		
	Inscribed Angles		
	Angle Measures and Segment Lengths		
	Circles in the Coordinate Plane		
	Locus: A Set of Points		

Unit Title	Lesson Title	Resource & Code	Pace
PROBABILITY	Experimental and Theoretical Probability		10 Hours
	Probability Distributions and Frequency Tables		
	Permutations and Combinations		

	Compound Probability		
	Probability Models		
	Conditional Probability Formulas		
	Modeling Randomness		

Unit Title	Lesson Title	Resource & Code	Pace
FFA	Leadership Development	AFNR: B2-4	5 Hours

Unit Title	Lesson Title	Resource & Code	Pace
SAE	Career Exploration and Planning	SAE For ALL	10 Hours
	Employability Skills for College and Career Readiness	SAE For ALL	
	Personal Financial Management and Planning	SAE For ALL	
	Workplace Safety	SAE For ALL	
	Developing an Immersion SAE	SAE For ALL	

Unit Title	Lesson Title	Resource & Code	Pace
Communication	Verbal Communication Skills	AFNR: D3-2	10 Hours
	Written Communication Skills	AFNR: D2-1	
	Developing a Resume	AFNR: E2-2	
	Developing a Cover Letter	AFNR: E2-3	
	Interview Skills	AFNR: E2-4	
	Agricultural Literacy		
			180

Illinois Agricultural Education State Curriculum
Lesson titles shown with a code have been developed as the Illinois Agricultural Education State Curriculum and are available free to all schools with an approved agricultural education program. Resources for each lesson title include teacher lesson plan, PowerPoint presentation with guided notes, student Eunit reading resource, worksheets, and an assessment(quiz). This state-provided curriculum of 1200 lessons is located at www.ilaged.org. The lessons are coded by the library as indicated below:

Coding

Appendix	Descriptions
AFNR	Agriculture, Food and Natural Resources
*	National FFA Education Resources

Additional Resources:

AET Lessons: The Agricultural Experience Tracker

Ag Explorer

Explore SAE
National FFA Current Event Resources
National FFA Resources
National FFA SAE Resources
SAE for ALL:

FFA LEADERSHIP

Membership:
Members must pay dues, or be members of an affiliated chapter, and are eligible for all activities, with the exception of those specifically restricted in the rules. Please reference your local FFA Constitution and By-Laws to determine how FFA Membership is conducted in your local chapter.

Degrees:
The local chapter will award Chapter FFA Degrees to 10th and 11th-grade members enrolled in an approved agriculture education class taught by a certified teacher. Members enrolled in 11th and 12th grade are also eligible for the Illinois FFA State Degree if minimum qualifications are met. For more information on FFA Degrees, please visit https://www.ilaged.org/degrees

Leadership & Career Development Events:
Members are eligible to participate in career and leadership development events at the section, district, state, and national levels. For more information about these events in Illinois, visit https://www.ilaged.org/CDE

SUPERVISED AGRICULTURAL EXPERIENCE

Members are able to complete Supervised Agricultural Experience (SAE) records and compete for the honors through proficiency awards and degrees. To learn more about SAEs, visit http://exploresae.com.

PACE FRAMEWORK ALIGNMENT

To view the full PaCE Framework click here.