

# Kansas Academy of Mathematics & Science (KAMS) Curriculum Alignment with Kansas Graduation Requirements and Suggested Schedules

## Suggested Pre-KAMS Curriculum information for Parents and School Counselors

KAMS is a major commitment by the student, parents or guardians, sending school, Fort Hays State University, and the state of Kansas. KAMS is selective in its admissions. Students must be academically prepared to enter KAMS. They also must demonstrate social and behavioral maturity. Preparing to apply for KAMS begins as early as 7<sup>th</sup> grade. All students applying to KAMS must have successfully completed, at a minimum, Geometry and Algebra II. Starting in middle school, potential KAMS students should seize every opportunity to take the most challenging and advanced coursework available.

Middle school students considering KAMS, should look closely at the high school graduation requirements for the local school and the KAMS curriculum. KAMS applicants must carefully choose their 9<sup>th</sup> and 10<sup>th</sup> grade coursework to assure that they complete those locally offered courses and special requirements that are not part of the KAMS curriculum.

Table 1 provides the suggested 9<sup>th</sup> and 10<sup>th</sup> grade curriculum for students considering an application to the Kansas Academy of Mathematics and Science (KAMS). The identified course work provides a **sample** of minimum coursework in preparation for KAMS.

**Table 1. Suggested 9<sup>th</sup> and 10<sup>th</sup> Grade Curriculum at the Local High School:**

9 <sup>TH</sup> GRADE		10 <sup>TH</sup> GRADE	
<i>COURSES:</i>	<i>UNITS:</i>	<i>COURSES:</i>	<i>UNITS:</i>
English I	1	English II	1
Algebra II (Note: Geometry taken in 8 <sup>th</sup> grade)	1	Functions/Stats/Trig	1
Science (physical)	1	Science (biology)	1
Physical Education/Health	1	Science (chemistry)	1
Technology	1	World History II	.5
World History I	.5	Foreign Language	1
Foreign Language	1	Practical Arts	.5
Practical Arts	.5	Electives	1
<b>7 units total</b>		<b>7 units total</b>	

\*US History may be taken in place of World History.

When reviewing the proposed course sequence, potential KAMS students should **consult with their academic counselor to assure that local graduation requirements will be met through the 9<sup>th</sup> and 10<sup>th</sup> grade courses when combined with the KAMS curriculum (see Table 2)**. While the KAMS staff will work with each student to assure completion of all requirements for local graduation, final responsibility lies with the students and parents/guardians.

If a student has completed the equivalent KAMS courses in History, English, or Communications at his or her local school, elective courses at KAMS may be selected pending approval by the KAMS academic counselor. A mathematics placement test will be used to determine appropriate placement. A student whose scores allow her/him to be placed in Calculus will have a 3 hour free elective during her/his first semester of the Junior year. Appendix A of this document identifies the course outcomes of the Pre-Calculus Class. Please use this to help identify the preparation needed at the local high school and also in considering advanced KAMS placement in mathematics. Further information on acceptance of college coursework and electives that can be applied to the KAMS curriculum is found in the KAMS Handbook available at: <http://www.fhsu.edu/kams>.

**Table 2. Kansas Academy of Mathematics & Science Curriculum for a Typical Entering Student:**

11 <sup>TH</sup> GRADE				12 <sup>TH</sup> GRADE			
FALL SEMESTER		SPRING SEMESTER		FALL SEMESTER		SPRING SEMESTER	
COURSES:	CH's:	COURSES:	CH's:	COURSES:	CH's:	COURSES:	CH's:
MATH 130 Pre-Calculus	3	MATH 234 Analytic Geometry & Calculus I	5	MATH 235 Analytic Geometry & Calculus II	5	LDRS 120 Issues in Leadership: Seven Revolutions	3
CHEM 120/120L University Chemistry I	5	CHEM 121/121L University Chemistry II	5	PHYS 211/211L Physics for Scientists and Engineers I	5	PHYS 212/212L Physics for Scientists and Engineers II	5
ENG 101 Comp I	3	ENG 102 Comp II	3	COMM 100 Fundamentals of Oral Communication	3	POLS 101 American Government	3
HIST 130 US History before 1877	3*	HIST 131 US History after 1877	3*	BIOL 180/180L Principles of Biology	4	COMPUTER SCIENCE ELECTIVE (computers, graphics arts, etc)	3
GSCI XXX Global Climate Change: Science and Impacts	3+			XXX XXX Departmental Research and Writing Course	1%	XXX XXX Departmental Research and Writing Course	3
Colloquia	0	Colloquia	0	Colloquia	0	Colloquia	0
<b>Total: 17 CH's</b>		<b>Total: 16 CH's</b>		<b>Total: 18 CH's</b>		<b>Total: 17 CH's</b>	

\* World History if US History requirements were previously met  
 + Course being developed  
 % Course title determined by the department selected for research

## Counselor and Parent Course Alignment in Meeting State Minimum High School Graduation Requirements

The following tables (Table 3 through Table 9) are provided as a reference in determining coursework for meeting state and local high school graduation requirements. This is based on the following minimums: 4 Units of English, 3 Units of History and Government, 3 Units of Science, 3 Units of Mathematics, 1 Unit of Physical Education, 1 Unit of Fine Arts, 6 Units of Electives. Local requirements should be considered in planning.

**Table 3. English (4, but can be waived to 3)**

Suggested Courses taken at the High School:	Units:	Courses taken at KAMS:	Credit Hours:	Unit Equivalent:
English I	1	ENG 101 Comp I	3	0.5
English II	1	ENG 102 Comp II	3	0.5
		COMM 100 Fundamentals of Oral Communication	3	0.5
		GSCI XXX Global Climate Change: Science and Impacts	3+	0.5
		XXX XXX Departmental Research and Writing Course (spread over 2 semesters)	3%	0.5
Total:	2	Total:	9	3
<b>Grand Total = 5</b>				

+ Course under development  
% Title will vary by department

**Table 4. Fine Arts and/or Practical Arts (1\*)**

[TO BE DETERMINED BY LOCAL REQUIREMENTS AND COMPLETED PRIOR TO ATTENDING KAMS]

Suggested Courses taken at the High School:	Units:	Courses taken at KAMS:	Credit Hours:	Unit Equivalent:
Fine Arts/Practical Arts	1*	-	-	-
<b>Grand Total = 1*</b>				

\* Local variations on number of units

**Table 5. History and Government (3)**

[Must include: World History, US History, Government, Economic/Geography, Kansas]

Suggested Courses taken at the High School:	Units:	Courses taken at KAMS:	Credit Hours:	Unit Equivalent:
World History I	0.5	HIST 130 US History before 1877*	3	0.5
World History II	0.5	HIST 131 US History after 1877*	3	0.5
		POLS 101 American Government	3	0.5
		LDRS 120 Issues in Leadership: Seven Revolutions	3	0.5
Total:	1	Total:	12	2
<b>Grand Total = 3</b>				

\*World History if the US History Requirement is previously met

**Table 6. Physical Education (1\*)**

TO BE DETERMINED BY LOCAL REQUIREMENTS AND COMPLETED PRIOR TO ATTENDING KAMS

Suggested Courses taken at the High School:	Units:	Courses taken at KAMS:	Credit Hours:	Unit Equivalent:
Physical Education/Health	1*	–	–	–
<b>Grand Total = 1</b>				

\* Local variations on number of units

**Table 7. Science (3)**

[Physical, biological, earth and space science with one unit as a laboratory course]

Suggested Courses taken at the High School:	Units:	Courses taken at KAMS:	Credit Hours:	Unit Equivalent:
Science (physical/earth)	1	*	*	*
Science (biology)	1			
Science (chemistry)	1			
Total:	3	Total:	*	*
<b>Grand Total = 3*</b>				

\*Used to fulfill elective options for high school graduation. See Table 9.

**Table 8. Mathematics (3)**

Suggested Courses taken at the High School:	Units:	Courses taken at KAMS:	Credit Hours:	Unit Equivalent:
Algebra II +	1	MATH 130 Pre-Calculus (if indicated by test placement)	3	0.5
Functions/Statistics/Trigonometry	1	MATH 234 Analytic Geometry & Calculus I	5	0.5
		MATH 235 Analytic Geometry & Calculus II	5	0.5
Total:	2	Total:	13	1.5
<b>Grand Total = 3.5</b>				

+Assumes Algebra I &amp; Geometry in Middle School

**Table 9. Electives (6)**

Suggested Courses taken at the High School:	Units:	Courses taken at KAMS:	Credit Hours:	Unit Equivalent:
Free Electives	1	CHEM 121/121L University Chemistry I	5	0.5
Technology	1	CHEM 122/122L University Chemistry II	5	0.5
Foreign Language I	1	PHYS 211/211L Physics for Scientists and Engineers I	5	0.5
Foreign Language II	1	PHYS 212/212L Physics for Scientists and Engineers II	5	0.5
		BIOL 180/180L Principles of Biology	4	0.5
		Computer Science Elective	3	0.5
Total:	4	Total:	27	3
<b>Grand Total = 7</b>				

## **Appendix A.**

### **Pre-Calculus Outcomes**

Students will be expected to use appropriate technology as one tool to achieve the following outcomes:

#### **I. Analysis and graphing of functions and equations**

The student should be able to:

- A. Use functional notation.
- B. Recognize and distinguish between functions and relations (equations).
- C. Use concepts of symmetry, intercepts, left- and right-hand behavior, asymptotes, and transformations to sketch the graph of various types of functions (constant, linear, quadratic, absolute value, piecewise-defined, square root, cubic, polynomial, rational, exponential, and logarithmic) or relations (circle) given in description.
- D. Determine the domain and range of a function.
- E. Write the equation that describes a function (for types given above) or circle given its description.
- F. Use graphs of functions for analysis.
- G. Determine arithmetic combinations and composites of functions.
- H. Determine the inverse of a function.

#### **II. Solutions of equations and inequalities**

The student should be able to:

- A. Solve equations listed in I (C), i.e. literal equations, quadratic equations by factoring and quadratic formula, equations involving rational expressions, equations involving radicals and equations involving absolute value expressions, along with equations involving exponential or logarithmic functions.
- B. Solve inequalities of the following types: linear (in one and two variables), polynomial, rational, absolute value.
- C. Solve systems of inequalities by graphing.
- D. Apply equations from II (A) to real-world situations, including but not limited to depreciation, growth and decay, max/min problems.
- E. Examine and analyze data, make predictions/interpretations, and do basic modeling.
- F. Solve systems of equations by various methods, including matrices.

#### **III. Trigonometry concepts**

The student should be able to:

- A. Understand the basic definitions of trigonometric functions using both a right triangle and the unit circle.
- B. Solve right triangles, and know trigonometric function values for special angles.
- C. Understand radian definition and measurement, and understand circular functions as real-valued functions.
- D. Analyze the graphs of the six basic trigonometric functions and their arithmetic combinations using the concepts of period, phase shift, amplitude, and displacement.
- E. Derive/verify trigonometric identities, including but not limited to double angle, half angle, angle sum and angle difference identities.
- F. Define, graph, and analyze inverse trigonometric functions.
- G. Solve equations involving trigonometric functions.
- H. Determine solutions of oblique triangles using the Law of Cosines or Law of Sines.
- I. Solve applications, including but not limited to vectors.