



FLOYD COUNTY BOARD OF EDUCATION
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William Newsome, Jr., Vice-Chair - District 3
Dr. Chandra Varia, Member- District 2
Keith Smallwood, Member - District 4
Steve Slone, Member - District 5

Consent Agenda Item (Action Item): Approve Introduction to Programming and AP Computer Science Principles as 3rd and/or 4th year math courses that count toward graduation requirements.

Applicable State or Regulations:

Board Policy 08:1131, 08:113, 08.11; KRS 158.6451, 704 KAR 003:303
BOE approval of graduation requirements

Fiscal/Budgetary Impact:

No financial issues to the budget

History/Background:


Students who are in the Computer Science pathway take Introduction to Programming and AP Computer Science Principles as courses. These students are taking these courses as a part of their pathway. These courses cover mathematics material in conjunction with computer science principles. The following documents have been provided to assist in making this decision: communication with computer science lead at KDE, mathematics and computer science crosswalk, and board policies. After reviewing these documents, we would like you to consider approving Introduction to Programming and AP Computer Science Principles as courses that could count as a 3rd and/or 4th level math course toward graduation requirements. Also, in the KY Graduation Requirements the students are required to have four math credits: Algebra 1, Geometry, and two credits aligned to the students ILP. These computer science courses are directly aligned to a Computer Science students' ILP.

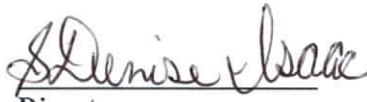
Recommended Action:

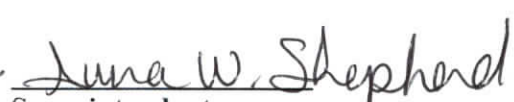
Approve the courses Introduction to Programming and AP Computer Science Principles as a 3rd and/or 4th year math credit toward graduation.

Contact Person(s):

Christina Crase, Principal


Principal


Director


Superintendent

Date:

1/6/23

The Floyd County Board of Education does not discriminate on the basis of race, color, national origin, age, religion, marital status, sex, or disability in employment, educational programs, or activities as set forth in Title IX & VI, and in Section 504.

Cross Walk of KAS/CTE Standards for Math and Computer Science Courses

Students who demonstrate		Course Coverage	Introduction to Programming	AP Computer Science Principles
				There are only four standards not covered and they all pertain to technology and the internet.
KY.HS.N.4	KY.HS.N.4 Use units in context as a way to understand problems and to guide the solution of multi-step problems; ★ a. Choose and interpret units consistently in formulas; b. Choose and interpret the scale and the origin in graphs and data disp	All Math classes	standard 3, standard 4	Standard 1, standard 17
KY.HS.N.5	Define appropriate units in context for the purpose of descriptive modeling. ★	All Math classes		Standard 3, Standard 4,
KY.HS.N.6	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. ★	All Math classes		Standard 3, Standard 4,
KY.HS.N.7	Understanding properties of complex numbers. a. Know there is a complex number i such that $i^2 = -1$ and every complex number has the form $a + bi$ with a and b real. b. Use the relation $i^2 = -1$ and the commutative, associative and distributive properties to add, subtract and multiply complex numbers. c. (+) Find the conjugate of a complex number and use it to find the quotient of complex numbers.	Algebra 2 and Pre-Cal		Standard 4
KY.HS.N.9	KY.HS.N.9 Solve quadratic equations with real coefficients that have complex solutions.	Algebra 2 and Pre-Cal		Standard 3, Standard 4,
KY.HS.N.12	KY.HS.N.12 (+) Understand and apply properties of vectors. a. Recognize vector quantities as having both magnitude and direction. Represent vector quantities by directed line segments and use appropriate symbols for vectors and their magnitudes. b. Find the components of a vector by subtracting the coordinates of an initial point from the coordinates of a terminal point. c. Solve problems involving velocity and other quantities that can be represented by vectors.	Pre-Cal	standard 6	
KY.HS.A.15	KY.HS.A.15 Rearrange formulas to solve a literal equation, highlighting a quantity of interest, using the same reasoning as in solving equations.	Algebra 1 and Algebra 2	standard 12	

KY.HS.F.1	KY.HS.F.1 Understand properties and key features of functions and the different ways functions can be represented. a. Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then $f(x)$ denotes the output of f corresponding to the input x . b. Using appropriate function notation, evaluate functions for inputs in their domains and interpret statements that use function notation in terms of a context. c. For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities and sketch graphs showing key features given a verbal description of the relationship. d. Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. e. Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions)	Algebra 1 and Algebra 2		standard 22, and standard 23
KY.HS.F.2	KY.HS.F.2 Recognize that arithmetic and geometric sequences are functions, sometimes defined recursively, whose domain is a subset of the integers.	Algebra 1, Algebra 2	standard 5	
KY.HS.F.4	KY.HS.F.4 Graph functions expressed symbolically and show key features of the graph, with and without using technology (computer, graphing calculator). ★ a. Graph linear and quadratic functions and show intercepts, maxima and minima. b. Graph square root, cube root and absolute value functions. c. Graph polynomial functions, identifying zeros when suitable factorizations are available and showing end behavior. d. Graph exponential and logarithmic functions, showing intercepts and end behavior. e. (+) Graph trigonometric functions, showing period, midline and amplitude. f. (+) Graph piecewise functions, including step functions. g. (+) Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available and showing end behavior.	Algebra 1 and Algebra 2		standard 24, standard 30, standard 31, standard 32, standard 33, standard 34
KY.HS.F.5	KY.HS.F.5 Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. a. Identify zeros, extreme values and symmetry of the graph within the context of a quadratic function. b. Use the properties of exponents to interpret expressions for exponential functions and classify the exponential function as representing growth or decay.	Algebra 1 and Algebra 2		
KY.HS.F.6	KY.HS.F.6 Write a function that describes a relationship between two quantities. ★ a. Determine an explicit expression, a recursive process, or steps for calculation from a context. b. Combine standard function types using arithmetic operations. c. (+) Compose functions.	Algebra 1 and Algebra 2		standard 5, standard 7, standard 8, standard 21

KY.HS.F.10	KY.HS.F.10 Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents with the use of technology.	Algebra 2 and Pre-Cal		standard 6
KY.HS.F.11	KY.HS.F.11 Distinguish between situations that can be modeled with linear functions and with exponential functions. a. Recognize and justify that linear functions grow by equal differences over equal intervals and that exponential functions grow by equal factors over equal intervals. b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another. c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.	Algebra 1 and Algebra 2	standard 8	
KY.HS.SP.1	KY.HS.SP.1 Represent the distribution of data with plots on the real number line (stem plots, dot plots, histograms and box plots).	Statistics		standards 1,2,3,4
KY.HS.SP.3	KY.HS.SP.3 Interpret differences in shape, center and spread in the context of the distributions of the numerical data, accounting for the presence and possible effects of extreme data points (outliers).	Statistics		standard 25
KY.HS.SP.5	KY.HS.SP.5 Summarize categorical data for two or more categories in frequency tables. Calculate and interpret joint, marginal and conditional relative frequencies (probabilities) in the context of the data, recognizing possible associations and trends in the data.	Statistics		standard 14,15,16,24,34
KY.HS.SP.6	KY.HS.SP.6 Represent data on two quantitative variables on a scatter plot and describe how the explanatory and response variables are related. a. Calculate an appropriate mathematical model, or use a given mathematical model, for data to solve problems in context. b. Informally assess the fit of a model (through calculating correlation for linear data, plotting, calculating and/or analyzing residuals).	Statistics	standard 11	standard 14,15,16,24,34
KY.HS.SP.7	KY.HS.SP.7 Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.	Statistics		standard 14,15,16,24,34
KY.HS.SP.8	KY.HS.SP.8 Understand the role and purpose of correlation in linear regression. a. Use technology to compute correlation coefficient of a linear fit. b. Interpret the meaning of the correlation within the context of the data. c. Describe the limitations of correlation when establishing causation.	Statistics		standard 14,15,16,24,34
KY.HS.SP.9	KY.HS.SP.9 Understand statistics as a process for making inferences and justifying conclusions about population parameters based on a random sample from that population.	Statistics	standard 7	standard 18, 19, 20,24,34
KY.HS.SP.10	KY.HS.SP.10 Decide if a specified model is consistent with the results from a simulation.	Statistics		standard 9,10,11,12,13,24,34
KY.HS.SP.13	KY.HS.SP.13 Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between estimates or statistics are significant.	Statistics	standard 9, 13	

KY.HS.SP.16	KY.HS.SP.16 Understand the concept of conditional probability. a. Understand the conditional probability of A given B as $P(A \text{ and } B)/P(B)$. b. (+) Interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability of A and the conditional probability of B given A is the same as the probability of B	Statistics	standard 10	
KY.HS.SP.22	KY.HS.SP.22 (+) Develop a probability distribution for a random variable. a. Find an expected value based on a sample space in which theoretical probabilities can be calculated. b. Find an expected value based on a sample space in which empirical probabilities can be calculated.	Statistics	standard 1, and standard 2	

Crase, Christina (FCSI)

From: Jackson, Sean - Office of Education Technology <sean.jackson@education.ky.gov>
Sent: Wednesday, September 21, 2022 11:21 AM
To: Crase, Christina (FCSI)
Subject: Re: CS/Math

No problem at all. I responded, but it was late August (so much has happened since then). Below is the information I included.

I get this question all the time. The recently updated [FAQ for Minimum HS Graduation Requirements](#) in KY states: *Based on course standards, the teacher of record and district board decisions, a computer science course can qualify as an elective science course or as a third or fourth mathematics personalized course if the KAS for those content areas are met. Many computer science courses fit in career pathways as well. If these classes are part of the pathway and not used as a personalized science or mathematics class, they would be considered electives.*

So, if the course meets any of math or science standards (most ALL of the programming courses do and several others), your teacher has a math or science cert, AND your board of education approves it, you can count it as an elective science or third/fourth math course.

From: Crase, Christina (FCSI) <christina.crase@floyd.kyschools.us>
Date: Wednesday, September 21, 2022 at 7:38 AM
To: Jackson, Sean - Office of Education Technology <sean.jackson@education.ky.gov>
Subject: CS/Math

Good morning! You may have already previously answered this question but I can't find the email so I have to ask again. Is it correct that any CS course taught by a math teacher can be counted as a math class?

Christina Crase

Principal

Floyd County School of Innovation

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Christina.crase@floyd.kyschools.us

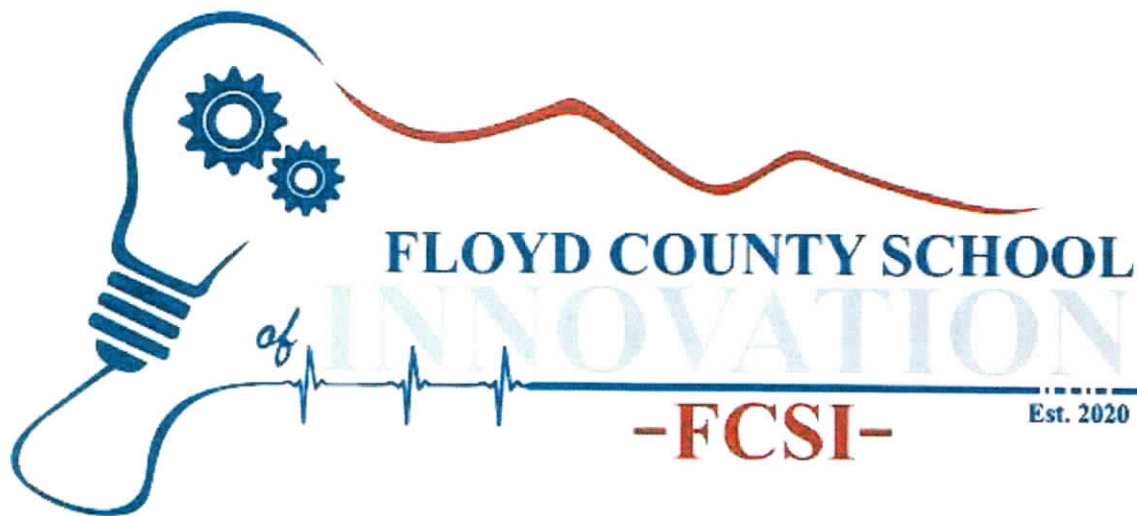
@ChristinaCrase

606-285-1766 (work)

Ext. 5301

606-454-8515 (cell)

"Trust in the Lord with all thine heart; and lean not unto thine own understanding. In all thy ways acknowledge him, and he shall direct thy paths." – Proverbs 3:5-6



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Alternative Credit Options

In addition to regular classroom-based instruction, students may earn credit by attending course(s) away from their high school of attendance to obtain certain courses required for graduation and/or to take advantage of postsecondary class/credit opportunities verified by the institution, the high school of attendance, and the District.

The District shall recognize only those online courses that meet the international standards for online teachers, courses, and programs that have been adopted by the Kentucky Department of Education.

Online courses may be subject to review by the Superintendent/designee for conformance with Kentucky Academic Standards and District graduation requirements.

DUAL-CREDIT SCHOLARSHIP PROGRAM

The District may offer the opportunity for students to earn dual-credits through the Kentucky Dual-Credit Scholarship Program and follows the guidelines outlined in the "*Kentucky Council on Postsecondary Education and Kentucky Department of Education Dual Credit Policy for Kentucky Public and Participating Postsecondary Institutions and Secondary Schools*," located on the Kentucky Department of Education website.

REFERENCES:

[KRS 158.622](#)
[KRS 164.786](#)
[013 KAR 002:020](#)

RELATED POLICIES:

08.1121; 08.113

Adopted/Amended: 7/24/2017
Order #: 19245

Graduation Requirements

In support of student development goals set out in [KRS 158.6451](#) and the Kentucky Academic Standards, students must complete a minimum of twenty-two (22) credits, including demonstrated performance-based competency in technology, and all other state and local requirements in order to graduate from high school in the District.

CIVICS EXAM REQUIREMENT

Students wishing to receive a regular diploma must pass a civics test made up of one hundred (100) questions selected from the civics test administered to persons seeking to become naturalized citizens and prepared or approved by the Board. A minimum score of sixty percent (60%) is required to pass the test and students may take the test as many times as needed to pass. Students that have passed a similar test within the previous five (5) years shall be exempt from this civics test. This shall be subject to the requirements and accommodations of a student's individualized education program (IEP) or a Section 504 Plan.⁵

INDIVIDUAL LEARNING PLAN (ILP)

Students shall complete an Individual Learning Plan (ILP) that focuses on career exploration and related postsecondary education and training needs.

ADDITIONAL REQUIREMENTS OF THE BOARD

In addition to the content requirements established by the Kentucky Academic Standards, and the credits required by the minimum requirements for high school graduation in [704 KAR 003:305](#), the Board may impose other requirements for graduation from high school. However, the Board shall not adopt any graduation requirements that include achieving a minimum score on a statewide assessment.

Graduation Requirements**FOR STUDENTS ENTERING GRADE NINE (9) ON OR AFTER THE FIRST DAY OF THE 2019-2020 ACADEMIC YEAR**

Credits shall include content standards as provided by the Kentucky Academic Standards established in 704 KAR 003:303 and 704 KAR Chapter 8. The required credits and demonstrated competencies shall include the following minimum requirements:

English/Language Arts	Four (4) Credits total (English I and II plus two (2) credits aligned to the student's ILP)
Social Studies	Three (3) Credits total – (Two (2) plus one (1) credit aligned to the student's ILP)
Mathematics	Four (4) Credits total (Algebra I and Geometry plus two (2) credits aligned to the student's ILP)
Science	Three (3) Credits total – (Two (2) credits incorporating lab-based scientific investigation experiences plus one (1) credit aligned to the student's ILP)
Health	One-half (1/2) Credit
P.E.	One-half (1/2) Credit
Visual and Performing Arts	One (1) Credit or a standards-based specialized arts course based on the student's ILP
Academic and Career Interest Standards-based Learning Experiences	Six (6) Credits total (Two (2) plus four (4) standards-based credits in an academic or career interest based on the student's ILP)
Technology	Demonstrated performance-based competency

Graduation Requirements**FOR STUDENTS ENTERING GRADE NINE (9) ON OR AFTER THE FIRST DAY OF THE 2020-2021 ACADEMIC YEAR**

Credits shall include content standards as provided by the Kentucky Academic Standards established in [704 KAR 003:303](#) and 704 KAR Chapter 8. The required credits and demonstrated competencies shall include the following minimum requirements:

English/Language Arts	Four (4) Credits total (English I and II plus two (2) credits aligned to the student's ILP)
Social Studies	Three (3) Credits total – (Two (2) plus one (1) credit aligned to the student's ILP)
Mathematics	Four (4) Credits total (Algebra I and Geometry plus two (2) credits aligned to the student's ILP)
Science	Three (3) Credits total – (Two (2) credits incorporating lab-based scientific investigation experiences plus one (1) credit aligned to the student's ILP)
Health	One-half (1/2) Credit
P.E.	One-half (1/2) Credit
Visual and Performing Arts	One (1) Credit or a standards-based specialized arts course based on the student's ILP
Academic and Career Interest Standards-based Learning Experiences	Six (6) Credits total (Two (2) plus four (4) standards-based credits in an academic or career interest based on the student's ILP)
Technology	Demonstrated performance-based competency
Financial Literacy	One (1) or more courses or programs that meet the financial literacy requirements pursuant to KRS 158.1411 .

Graduation Requirements**PERFORMANCE-BASED CREDITS**

In addition to Carnegie units, students may earn credit toward high school graduation through the District's standards-based, performance-based credit system that complies with requirements of Kentucky Administrative Regulation. Procedures for the developing and amending the system shall address the following:

1. Conditions under which high school credit will be granted under the system that allow students to demonstrate proficiency and earn credit for learning acquired outside the normal classroom setting, outside of school, or in prior learning;

Performance-based credit may be earned while the student is still "in school," but the instructional setting will look different from a traditional "seat time" environment.

2. Performance descriptors and their linkages to State content standards and academic standards;

At the high school level, performance descriptors and evaluation procedures shall be established to determine if the content and performance standards have been met.

3. Assessments and the extent to which state-mandated assessments will be used;
4. An objective grading and reporting process; and
5. Criteria to promote and support school and community learning experiences, such as internships and cooperative learning, in support of a student's ILP. Such experiences shall be supervised by qualified instructors and aligned with State and District content and performance standards.

The high school student handbook shall include complete details concerning specific graduation requirements.

In keeping with statutory requirements, the District shall accept for credit toward graduation and completion of high school course requirements an advanced placement or a high school equivalent course taken by a student in grades 5, 6, 7, or 8 if that student attains performance levels expected of high school students in the District as determined by achieving a score of "3" or higher on a College Board Advanced Placement examination or a grade of "B" or better in a high school equivalent.²

SENIOR RECORD REVIEW

By the end of the first semester, each senior's record shall be reviewed to determine eligibility for graduation. Written notification of ineligibility for graduation shall be provided by the Principal to both the student and parent.

TRANSITIONAL CLASS REQUIREMENTS

All students that have not met the Council for Post-Secondary Education's college readiness requirements in math based on the ACT scores during their junior year or by other approved assessments, will be required to take transitional math courses, as determined by the placement assessments, during their senior year.

Graduation Requirements

OTHER PROVISIONS

The Board may grant different diplomas to those students who complete credits above the minimum number as established by the Kentucky Board of Education. In addition, the Board may award a diploma to a student posthumously indicating graduation with the class with which the student was expected to graduate.

The Board, Superintendent, Principal, or teacher may award special recognition to students.

Consistent with the District's graduation practices for all students, an alternative high school diploma shall be awarded to students with disabilities in compliance with applicable legal requirements. In addition, former students may submit to the Superintendent a request that the District provide them with an alternative high school diploma to replace the certificate of attainment they received at time of graduation from the District.³

A student who is at least seventeen (17) years of age and who is a state agency child, as defined in KRS 158.135, shall be eligible to seek attainment of a High School Equivalency Diploma.

The Board may substitute an integrated, applied, interdisciplinary, occupational, technical, or higher-level course for a required course if the alternative course provides rigorous content.

EARLY GRADUATION CERTIFICATE

Students who meet all applicable legal requirements shall be eligible for early graduation in relation to receipt of a graduation diploma and an Early Graduation Certificate. Students wishing to follow an early graduation pathway shall notify the Principal of their intent prior to the beginning of grade nine (9) or as soon thereafter as the intent is known, but within the first thirty (30) school days of the academic year in which they wish to graduate. A Letter of Intent to Apply shall be entered into the student information system by October 1 of the year the student declares intent to graduate early.⁴

Students working toward receipt of an Early Graduation Certificate shall be supported by development and monitoring of an ILP to support their efforts.

To graduate early and earn an Early Graduation Certificate, a student shall successfully complete the requirements for early high school graduation as established in administrative regulation by the Kentucky Board of Education.

A student who has indicated an intent to graduate early may participate in the student's state administration of the college readiness exam prior to the junior year, if needed. Students who meet all applicable legal requirements shall be awarded a diploma and an Early Graduation Certificate.

GRADUATION CEREMONIES

Students shall have completed the necessary requirements to earn a diploma before they may participate in the graduation exercises.

The Superintendent or the Principal, with the written approval of the Superintendent, may deny any senior the privilege of participating in any or all of the graduation activities if the senior's conduct is such that it will discredit the graduating class or school.

Graduation exercises at individual secondary schools shall be held no earlier than the evening of the last day of school in the school term.

Graduation Requirements**TRANSCRIPTS**

Each graduating senior is entitled to three (3) free copies of his/her transcript.

DIPLOMAS FOR VETERANS

In keeping with statute and regulation, the Board shall award an authentic high school diploma to an honorably discharged veteran who did not complete high school prior to being inducted into the United States Armed Forces during World War II, the Korean conflict, or the Vietnam War.¹

REFERENCES:

¹ [KRS 40.010](#); [KRS 158.140](#); [704 KAR 007:140](#)

² [KRS 158.622](#)

³ [KRS 156.160](#); 20 U.S.C. § 1414

⁴ [KRS 158.142](#); [704 KAR 003:305](#)

⁵ [KRS 158.141](#)

[KRS 156.027](#); [KRS 158.135](#)

[KRS 158.141](#); [KRS 158.143](#); [KRS 158.183](#); [KRS 158.281](#)

[KRS 158.302](#); [KRS 158.645](#); [KRS 158.6451](#)

[KRS 158.860](#)

[013 KAR 002:020](#); [702 KAR 007:125](#); [703 KAR 004:060](#)

[704 KAR 003:303](#); [704 KAR 003:306](#); [704 KAR 007:090](#); 704 KAR Chapter 8

[OAG 78-348](#); [OAG 82-386](#)

[Kentucky Academic Standards](#)

RELATED POLICIES:

08.1131; 08.14; 08.22; 08.222; 08.4

09.126 (re requirements/exceptions for students from military families)

RELATED PROCEDURE:

09.12 AP.25

Adopted/Amended: 7/25/2022

Order #: 20091

Course of Study**DEVELOPMENT**

The Superintendent shall develop and disseminate to the schools a course of study for primary school through twelfth grade that will include minimum statutory and regulatory requirements¹ and additional requirements as specified by the Board.

ASSESSMENT OF STUDENT WORK / NONDISCRIMINATION

Consistent with District policies addressing assessment of student progress and grading as well as council and school policies relating to the determination of curriculum and assignments, instructional staff are expected to issue grades or assessments of student assignments, including in the classroom, based on responsiveness to the assigned task(s), accuracy, and quality of work, utilizing sound pedagogical judgment and providing modifications for students with disabilities as required by law, free from discrimination or penalty based on constitutionally protected expressions of religious or political views in otherwise responsive student submissions.

IMPLEMENTATION

Each teacher shall implement the course of study prescribed for the assigned grade and subject area.²

SBDM SCHOOLS

In schools operating under SBDM, the Superintendent shall determine which curriculum, textbooks, instructional materials, and student support services shall be provided in the school after consulting with the Board, the Principal, and the school council.

SYLLABUS

Teachers at all levels (preschool through adult education) shall develop a syllabus for each course, grade/level or subject (single and/or interdisciplinary area) they teach to communicate to students and parents the following information:

1. Prerequisites for the course
2. Topics to be covered
3. Order of material to be covered
4. Resources to be used
5. Planned testing points
6. Performance standards and expectations

Each year teachers shall distribute a current syllabus to their students and the students' parents/guardians as directed by the Superintendent/designee.

The Principal/designee shall make pertinent student achievement data available to each teacher and, in keeping with policies set by the council, monitor the process of reviewing and updating syllabi in response to such data.

Course of Study**COURSE COMPLETION**

Credit shall be awarded following successful of high school courses and final grades will be calculated as follows:

1. 1st nine weeks – 25%
2. 2nd nine weeks – 25%
3. 3rd nine weeks – 25%
4. 4th nine weeks – 25%

REFERENCES:

¹[704 KAR 003:303](#)

²[KRS 161.170](#)

[KRS 156.160](#); [KRS 158.100](#); [KRS 158.183](#)

[KRS 158.645](#); [KRS 158.6451](#)

[KRS 160.345](#)

[702 KAR 007:125](#)

[704 KAR 003:305](#)

Adopted/Amended: 7/25/2022

Order #: 20091