

Secondary Course Description

COVER PAGE	
1. Course Title: Integrated Mathematics III Honors	2. Transcript Title / Abbreviation: Int. Math III H
3. Transcript Course Code / Number (Office Use Only):	4. School: Davis Senior High School, Da Vinci High School, Davis School for Independent Study, King High School
5. District: Davis Joint Unified School District	6. Length of Course: One Year – Fall/Spring
7. School / District Web Site: http://www.djUSD.net	8. School Contact Name: Troy Allen Title/Position: Director, Curriculum & Instruction Phone: 530/757-5300 Ext.: 150 Fax: E-mail: tallen@djUSD.net
9. Subject Area: <div style="display: flex; flex-wrap: wrap;"> <div style="width: 33%;"><input type="checkbox"/> History/Social Science</div> <div style="width: 33%;"><input type="checkbox"/> English</div> <div style="width: 33%;"><input checked="" type="checkbox"/> Mathematics</div> <div style="width: 33%;"><input type="checkbox"/> Science</div> <div style="width: 33%;"><input type="checkbox"/> Language other than English</div> <div style="width: 33%;"><input type="checkbox"/> Visual & Performing Arts</div> <div style="width: 33%;"><input type="checkbox"/> DJUSD Graduation Elective</div> <div style="width: 33%;"><input type="checkbox"/> College Prep Elective (will seek UC/CSU approval)</div> </div>	
10. Grade Level(s): 10-12	11. Seeking "Honors" Distinction? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
12. Credit Value: <div style="display: flex; flex-wrap: wrap;"> <div style="width: 50%;"><input type="checkbox"/> 0.5 (half year or semester equivalent)</div> <div style="width: 50%;"><input checked="" type="checkbox"/> 1.0 (one year equivalent)</div> <div style="width: 50%;"><input type="checkbox"/> 2.0 (two year equivalent)</div> <div style="width: 50%;"><input type="checkbox"/> Other: _____</div> </div>	
13. Was this course previously approved by UC? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If so, in what year? _____ Under what course title? _____	
14. Pre-Requisites: Integrated Mathematics II with an A and teacher recommendation Co-Requisites: None	
15. Preliminary Approval - Secondary Site Principal Signature (Must be signed before proceeding to Step 16): _____	
16. Date Course Proposal with Preliminary Approval (Step 15) sent to Associate Superintendent, Educational Services: _____	
17. Review & Approval: <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> Date _____ Site Curriculum and Instruction Leadership Team Secondary Department Articulation/Collaboration Secondary Principals Signatures: _____ Date: _____ </div> <div style="width: 45%; text-align: right;"> Signature Signature/Title _____ Signature/Title <u><i>Deane Schaefer</i></u> </div> </div>	

BACKGROUND INFORMATION

In 2010 the California State Department of Education adopted the Common Core State Standards for Mathematics. The goal of the Common Core State Standards for Mathematics is for students to be college and career ready upon graduation from high school and to assist students in becoming competitive in a global economy. Therefore, the Common Core State Standards for Mathematics provide not only for rigorous curriculum and instruction, but also conceptual understanding, procedural skill and fluency and the ability to apply mathematics. Students will develop the skills to be able to problem-solve creatively and not be satisfied by just arriving at an answer, thus meeting the challenges of the 21st century.

These new Standards for Mathematics have been developed to provide students with the knowledge, skills, and understanding in mathematics to be college and career ready when they complete high school. They are internationally benchmarked and assist students in their preparation for enrollment at a public or private university.

The Common Core State Standards for Mathematics include two types of standards:

1. Eight Standards for Mathematical Practice that are the same in each grade level and high school mathematics course.
2. Mathematical Content Standards that are organized into high school courses.

“Together these standards address both ‘habits of mind’ that students should develop to foster mathematical understanding and expertise and skills and knowledge – what students need to know and be able to do. The mathematical content standards were built on progressions of topics across a number of grade levels, informed both by research on children’s cognitive development and by the logical structure of mathematics.”

Adapted from California Common Core State Standards – Mathematics
Introduction, page 2

In August of 2014, Davis Joint Unified went through a process with all of the secondary math teachers to determine the pathways for implementation of the Common Core State Standards. Through this process it was unanimously decided to follow the Integrated Pathway to help our students become college and career ready along with having a cohesive TK-12 math program for all of our students.

The Integrated Pathway is made up of three courses (Mathematics I, II, and III). The integrated mathematics courses follow the structure began in the K-8 standards of presenting mathematics as a multifaceted, coherent subject, and is the way most other high performing countries present higher mathematics. Each course is comprised of standards selected from the six high school conceptual categories, which were written to encompass the scope of content and skills to be addressed throughout grades 9–12 rather than through any single course. By the end of eighth grade, students have learned to solve linear equations in one variable and have applied graphical and algebraic methods to analyze and solve systems of linear equations in two variables. They have defined, evaluated, and compared functions, and used them to model relationships between quantities. Students have worked with radicals and applied the laws of exponents to situations involving integer exponents.

CCSS recommends more than one opportunity for acceleration (Appendix A, p. 81). Of the five suggested options for acceleration in Appendix A, district math teachers identified the fifth option as the optimal option to accelerate at the high school level, and proposed the creation of a hybrid Integrated Math III – Precalculus course that allows students to go straight to calculus.

Context for Course: List the State/District Standards addressed in this course.
See attached Standards Sheet.

History of Course Development: See Background Information.

COURSE GOALS AND/OR MAJOR STUDENT OUTCOMES

Description of how this course supports district goal to increase student awareness and appreciation of diversity:

Integrated Math III Honors is a second acceleration option which gives students the opportunity to study Calculus in high school. The first acceleration point is CC2/3 offered in 7th grade. Students that take CC2/3 in 7th grade will be able to take AP Calculus AB in 12th grade. Integrated Math III Honors will give these students a second opportunity to accelerate in 10th grade and take Calculus AB in 11th grade followed by Calculus BC in 12th grade. Students that were not ready/able to accelerate in 7th grade will have a second chance to accelerate in 11th grade, then take Calculus AB in 12th grade.

COURSE OBJECTIVES

It is in the Mathematics III H course that students integrate and apply the mathematics they have learned from their earlier courses. This course includes standards from the conceptual categories of Number and Quantity, Algebra, Functions, Geometry, and Statistics and Probability. Some standards are repeated in multiple higher mathematics courses; therefore instructional notes, which appear in brackets, indicate what is appropriate for study in this particular course. Standards that were limited in Mathematics I and Mathematics II no longer have those restrictions in Mathematics III H.

For the Mathematics III H course, instructional time should focus on five critical areas: (1) apply methods from probability and statistics to draw inferences and conclusions from data; (2) expand understanding and applications of functions and their graphs to include polynomial, rational, and radical functions, and inverse functions; (3) expand right triangle trigonometry to include general triangles, cofunctions, inverse functions and the unit circle, and graph transformations of functions using radians; (4) develop an understanding of limits of sequences and functions, and continuity of functions; and (5) consolidate functions and geometry to create models and solve contextual problems.

COURSE OUTLINE

Integrated Mathematics III Honors Course Outline

Number and Quantity

The Complex Number System

- ☐ Use complex numbers in polynomial identities and equations.

Algebra

Seeing Structure in Expressions

- ☐ Interpret the structure of expressions.
- ☐ Write expressions in equivalent forms to solve problems.

Arithmetic with Polynomials and Rational Expressions

- ☐ Perform arithmetic operations on polynomials.
- ☐ Understand the relationship between zeros and factors of polynomials.
- ☐ Use polynomial identities to solve problems
- ☐ Rewrite rational expressions.

Creating Equations

- ☐ Create equations that describe numbers or relationships.

Reasoning with Equations and Inequalities

- ☐ Understand solving equations as a process of reasoning and explain the reasoning.
- ☐ Represent and solve equations and inequalities graphically.

Functions

Interpreting Functions

- ☐ Interpret functions that arise in applications in terms of the context
- ☐ Analyze functions using different representations.

- ☐ Determine Average Rate of Change using Difference Quotients

Building Functions

- ☐ Build a function that models a relationship between two quantities.
☐ Build new functions from existing functions.

Linear, Quadratic, and Exponential Models

- ☐ Construct and compare linear, quadratic, and exponential models and solve problems.

Trigonometric Functions

- ☐ Extend the domain of trigonometric functions using the unit circle.
☐ Graph transformations of all six trigonometric functions (using radians)
☐ Model periodic phenomena with trigonometric functions.
☐ Understand inverse trigonometric functions and graph them
☐ Polar coordinates

Limits and Continuity of Functions

- ☐ Find limits of functions using informal definition of limit
☐ Examine continuity of functions and find limits involving infinity

Geometry

Similarity, Right Triangles, and Trigonometry

- ☐ Apply trigonometry to general triangles.

Expressing Geometric Properties with Equations

- ☐ Translate between the geometric description and the equation for a conic section.

Geometric Measurement and Dimension

- ☐ Visualize relationships between two-dimensional and three-dimensional objects.

Modeling with Geometry

- ☐ Apply geometric concepts in modeling situations.

Statistics and Probability

Interpreting Categorical and Quantitative Data

- ☐ Summarize, represent, and interpret data on a single count or measurement variable.

Making Inferences and Justifying Conclusions

- ☐ Understand and evaluate random processes underlying statistical experiments.
☐ Make inferences and justify conclusions from sample surveys, experiments, and observational studies.

Using Probability to Make Decisions

- ☐ Use probability to evaluate outcomes of decisions.

TEXTS AND SUPPLEMENTAL INSTRUCTIONAL MATERIALS

Integrated Math III: *Core Connections, Integrated III*, CPM (2014)

Precalculus: *Precalculus*, Holt (2004)

Previously Adopted? ☒ Yes ☐ No (If no, provide information directly below)

(previously adopted for Integrated Math III and Precalculus courses)

Cost per book **\$54**

Total Cost **\$2160.00**

Budget Source: Instructional Materials Budget

DIFFERENTIATED INSTRUCTIONAL METHODS AND/OR STRATEGIES

Strategies for Supporting School Goal of Improving Writing Skills:

Certain assignments have required written components, requiring original expression and articulating reasoning for problem solving.

ASSESSMENT METHODS AND/OR TOOLS

Pre and Post tests
Formative Assessments
Benchmark Assessments
Summative Assessments
Performance Tasks
Written work
Observation record of student performance
Completion of assignments and worksheets

ASSESSMENT CRITERIA

Students are presented with course criteria and necessary skills and concepts. This is followed by formative assessments, benchmark assessments and summative assessments with diverse types of performance tasks. Learning is successive, providing students opportunities for mastery over the course of the year.

HONORS COURSES ONLY

Sequence Participation

Describe what sequence this course would be a part of, and what role in the sequence this course plays.

This course is part of the continued sequence of Common Core Mathematics in the Integrated Pathway.

Post-Secondary Articulation

Indicate what post-secondary articulation this sequence offers: is this course part of a pathway that results in certification or college credit?

The sequence of courses is articulated with CSU and UC systems.

Secondary Course Description

COVER PAGE																					
1. Course Title: Integrated Mathematics III Honors	2. Transcript Title / Abbreviation: Int. Math III H																				
3. Transcript Course Code / Number (Office Use Only):	4. School: Davis Senior High School, Da Vinci High School, Davis School for Independent Study, King High School																				
5. District: Davis Joint Unified School District	6. Length of Course: One Year – Fall/Spring																				
7. School / District Web Site: http://www.djUSD.net	8. School Contact Name: Troy Allen Title/Position: Director, Curriculum & Instruction Phone: 530/757-5300 Ext.: 150 Fax: E-mail: tallen@djUSD.net																				
9. Subject Area: <div style="display: flex; flex-wrap: wrap;"> <div style="width: 33%;"><input type="checkbox"/> History/Social Science</div> <div style="width: 33%;"><input type="checkbox"/> English</div> <div style="width: 33%;"><input checked="" type="checkbox"/> Mathematics</div> <div style="width: 33%;"><input type="checkbox"/> Science</div> <div style="width: 33%;"><input type="checkbox"/> Language other than English</div> <div style="width: 33%;"><input type="checkbox"/> Visual & Performing Arts</div> <div style="width: 33%;"><input type="checkbox"/> DJUSD Graduation Elective</div> <div style="width: 33%;"><input type="checkbox"/> College Prep Elective (will seek UC/CSU approval)</div> </div>																					
10. Grade Level(s): 10-12	11. Seeking "Honors" Distinction? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No																				
12. Credit Value: <div style="display: flex; flex-wrap: wrap;"> <div style="width: 50%;"><input type="checkbox"/> 0.5 (half year or semester equivalent)</div> <div style="width: 50%;"><input checked="" type="checkbox"/> 1.0 (one year equivalent)</div> <div style="width: 50%;"><input type="checkbox"/> 2.0 (two year equivalent)</div> <div style="width: 50%;"><input type="checkbox"/> Other: _____</div> </div>																					
13. Was this course previously approved by UC? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If so, in what year? _____ Under what course title? _____																					
14. Pre-Requisites: Integrated Mathematics II with an A and teacher recommendation Co-Requisites: None																					
15. Preliminary Approval - Secondary Site Principal Signature (Must be signed before proceeding to Step 16): _____																					
16. Date Course Proposal with Preliminary Approval (Step 15) sent to Associate Superintendent, Educational Services: _____																					
17. Review & Approval: <table style="width: 100%; border: none;"> <tr> <td style="width: 15%; text-align: center;">Date</td> <td style="width: 40%;"></td> <td style="width: 15%; text-align: center;">Signature</td> <td style="width: 30%;"></td> </tr> <tr> <td>_____</td> <td>Site Curriculum and Instruction Leadership Team</td> <td>Signature/Title</td> <td>_____</td> </tr> <tr> <td>_____</td> <td>Secondary Department Articulation/Collaboration</td> <td>Signature/Title</td> <td>_____</td> </tr> <tr> <td colspan="4">Secondary Principals Signatures: _____</td> </tr> <tr> <td>Date: _____</td> <td colspan="3">_____</td> </tr> </table>		Date		Signature		_____	Site Curriculum and Instruction Leadership Team	Signature/Title	_____	_____	Secondary Department Articulation/Collaboration	Signature/Title	_____	Secondary Principals Signatures: _____				Date: _____	_____		
Date		Signature																			
_____	Site Curriculum and Instruction Leadership Team	Signature/Title	_____																		
_____	Secondary Department Articulation/Collaboration	Signature/Title	_____																		
Secondary Principals Signatures: _____																					
Date: _____	_____																				

BACKGROUND INFORMATION

In 2010 the California State Department of Education adopted the Common Core State Standards for Mathematics. The goal of the Common Core State Standards for Mathematics is for students to be college and career ready upon graduation from high school and to assist students in becoming competitive in a global economy. Therefore, the Common Core State Standards for Mathematics provide not only for rigorous curriculum and instruction, but also conceptual understanding, procedural skill and fluency and the ability to apply mathematics. Students will develop the skills to be able to problem-solve creatively and not be satisfied by just arriving at an answer, thus meeting the challenges of the 21st century.

These new Standards for Mathematics have been developed to provide students with the knowledge, skills, and understanding in mathematics to be college and career ready when they complete high school. They are internationally benchmarked and assist students in their preparation for enrollment at a public or private university.

The Common Core State Standards for Mathematics include two types of standards:

1. Eight Standards for Mathematical Practice that are the same in each grade level and high school mathematics course.

2. Mathematical Content Standards that are organized into high school courses.

“Together these standards address both ‘habits of mind’ that students should develop to foster mathematical understanding and expertise and skills and knowledge – what students need to know and be able to do. The mathematical content standards were built on progressions of topics across a number of grade levels, informed both by research on children’s cognitive development and by the logical structure of mathematics.”

Adapted from California Common Core State Standards – Mathematics
Introduction, page 2

In August of 2014, Davis Joint Unified went through a process with all of the secondary math teachers to determine the pathways for implementation of the Common Core State Standards. Through this process it was unanimously decided to follow the Integrated Pathway to help our students become college and career ready along with having a cohesive TK-12 math program for all of our students.

The Integrated Pathway is made up of three courses (Mathematics I, II, and III). The integrated mathematics courses follow the structure began in the K-8 standards of presenting mathematics as a multifaceted, coherent subject, and is the way most other high performing countries present higher mathematics. Each course is comprised of standards selected from the six high school conceptual categories, which were written to encompass the scope of content and skills to be addressed throughout grades 9–12 rather than through any single course. By the end of eighth grade, students have learned to solve linear equations in one variable and have applied graphical and algebraic methods to analyze and solve systems of linear equations in two variables. They have defined, evaluated, and compared functions, and used them to model relationships between quantities. Students have worked with radicals and applied the laws of exponents to situations involving integer exponents.

CCSS recommends more than one opportunity for acceleration (Appendix A, p. 81). Of the five suggested options for acceleration in Appendix A, district math teachers identified the fifth option as the optimal option to accelerate at the high school level, and proposed the creation of a hybrid Integrated Math III – Precalculus course that allows students to go straight to calculus.

Context for Course: List the State/District Standards addressed in this course.
See attached Standards Sheet.

History of Course Development: See Background Information.

COURSE GOALS AND/OR MAJOR STUDENT OUTCOMES

Description of how this course supports district goal to increase student awareness and appreciation of diversity:

Integrated Math III Honors is a second acceleration option which gives students the opportunity to study Calculus in high school. The first acceleration point is CC2/3 offered in 7th grade. Students that take CC2/3 in 7th grade will be able to take AP Calculus AB in 12th grade. Integrated Math III Honors will give these students a second opportunity to accelerate in 10th grade and take Calculus AB in 11th grade followed by Calculus BC in 12th grade. Students that were not ready/able to accelerate in 7th grade will have a second chance to accelerate in 11th grade, then take Calculus AB in 12th grade.

COURSE OBJECTIVES

It is in the Mathematics III H course that students integrate and apply the mathematics they have learned from their earlier courses. This course includes standards from the conceptual categories of Number and Quantity, Algebra, Functions, Geometry, and Statistics and Probability. Some standards are repeated in multiple higher mathematics courses; therefore instructional notes, which appear in brackets, indicate what is appropriate for study in this particular course. Standards that were limited in Mathematics I and Mathematics II no longer have those restrictions in Mathematics III H.

For the Mathematics III H course, instructional time should focus on five critical areas: (1) apply methods from probability and statistics to draw inferences and conclusions from data; (2) expand understanding and applications of functions and their graphs to include polynomial, rational, and radical functions, and inverse functions; (3) expand right triangle trigonometry to include general triangles, cofunctions, inverse functions and the unit circle, and graph transformations of functions using radians; (4) develop an understanding of limits of sequences and functions, and continuity of functions; and (5) consolidate functions and geometry to create models and solve contextual problems.

COURSE OUTLINE

Integrated Mathematics III Honors Course Outline

Number and Quantity

The Complex Number System

- ☐ Use complex numbers in polynomial identities and equations.

Algebra

Seeing Structure in Expressions

- ☐ Interpret the structure of expressions.
- ☐ Write expressions in equivalent forms to solve problems.

Arithmetic with Polynomials and Rational Expressions

- ☐ Perform arithmetic operations on polynomials.
- ☐ Understand the relationship between zeros and factors of polynomials.
- ☐ Use polynomial identities to solve problems
- ☐ Rewrite rational expressions.

Creating Equations

- ☐ Create equations that describe numbers or relationships.

Reasoning with Equations and Inequalities

- ☐ Understand solving equations as a process of reasoning and explain the reasoning.
- ☐ Represent and solve equations and inequalities graphically.

Functions

Interpreting Functions

- ☐ Interpret functions that arise in applications in terms of the context
- ☐ Analyze functions using different representations.
- ☐ Determine Average Rate of Change using Difference Quotients
- Building Functions**
 - ☐ Build a function that models a relationship between two quantities.
 - ☐ Build new functions from existing functions.
- Linear, Quadratic, and Exponential Models**
 - ☐ Construct and compare linear, quadratic, and exponential models and solve problems.
- Trigonometric Functions**
 - ☐ Extend the domain of trigonometric functions using the unit circle.
 - ☐ Graph transformations of all six trigonometric functions (using radians)
 - ☐ Model periodic phenomena with trigonometric functions.
 - ☐ Understand inverse trigonometric functions and graph them
 - ☐ Polar coordinates
- Limits and Continuity of Functions**
 - ☐ Find limits of functions using informal definition of limit
 - ☐ Examine continuity of functions and find limits involving infinity

Geometry**Similarity, Right Triangles, and Trigonometry**

- ☐ Apply trigonometry to general triangles.

Expressing Geometric Properties with Equations

- ☐ Translate between the geometric description and the equation for a conic section.

Geometric Measurement and Dimension

- ☐ Visualize relationships between two-dimensional and three-dimensional objects.

Modeling with Geometry

- ☐ Apply geometric concepts in modeling situations.

Statistics and Probability**Interpreting Categorical and Quantitative Data**

- ☐ Summarize, represent, and interpret data on a single count or measurement variable.

Making Inferences and Justifying Conclusions

- ☐ Understand and evaluate random processes underlying statistical experiments.
- ☐ Make inferences and justify conclusions from sample surveys, experiments, and observational studies.

Using Probability to Make Decisions

- ☐ Use probability to evaluate outcomes of decisions.

TEXTS AND SUPPLEMENTAL INSTRUCTIONAL MATERIALSIntegrated Math III: *Core Connections, Integrated III*, CPM (2014)

Precalculus: Precalculus, Holt (2004)

Previously Adopted? ☒ Yes ☐ No (If no, provide information directly below)

(previously adopted for Integrated Math III and Precalculus courses)

Cost per book TBD

Total Cost TBD

Budget Source: Instructional
Materials Budget**DIFFERENTIATED INSTRUCTIONAL METHODS AND/OR STRATEGIES****Strategies for Supporting School Goal of Improving Writing Skills:**

Certain assignments have required written components, requiring original expression and articulating reasoning for problem solving.

ASSESSMENT METHODS AND/OR TOOLS

Pre and Post tests
Formative Assessments
Benchmark Assessments
Summative Assessments
Performance Tasks
Written work
Observation record of student performance
Completion of assignments and worksheets

ASSESSMENT CRITERIA

Students are presented with course criteria and necessary skills and concepts. This is followed by formative assessments, benchmark assessments and summative assessments with diverse types of performance tasks. Learning is successive, providing students opportunities for mastery over the course of the year.

HONORS COURSES ONLY

Sequence Participation

Describe what sequence this course would be a part of, and what role in the sequence this course plays.

This course is part of the continued sequence of Common Core Mathematics in the Integrated Pathway.

Post-Secondary Articulation

Indicate what post-secondary articulation this sequence offers: is this course part of a pathway that results in certification or college credit?

The sequence of courses is articulated with CSU and UC systems.