



Santa Rosa City Schools
Office of Educational Services 7-12
2022-2023 New Course Proposal

(Must be submitted to the Office of Educational Services, 7-12)

(Please type)

Course Title: AP Precalculus HP

School: SRCS Department: Math Grade Level(s): 9-12 Credits: 10

Core subject area (specify): <u>Mathematics</u>	OR	Elective subject area (specify):
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Length of Course: X year _____ semester

Course Designations: *Check all other designations that apply.*

- | | | |
|--|--|--|
| <input type="checkbox"/> University Pathway | <input type="checkbox"/> Non-College Preparatory | <input checked="" type="checkbox"/> Advanced Placement |
| <input type="checkbox"/> Career Pathway * | <input type="checkbox"/> Regional Occupational Program | <input type="checkbox"/> International Baccalaureate |
| <input type="checkbox"/> Core Curriculum | <input type="checkbox"/> Advanced (grades 7-8) | <input type="checkbox"/> Other: _____ |
| <input type="checkbox"/> College Preparatory | <input type="checkbox"/> Honors (grades 9-12) | <input type="checkbox"/> Alternative Credit: _____ |

Assurances			
Does the textbook and proposed course meet District-adopted content and performance standards and State curriculum frameworks?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
Will the scope and sequence of this course adequately prepare students to pass the exit or end-of-course exam?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A

Signatures: Originator *[Signature]* Date 3/17/23
 Dept. Chair/Team Leader _____ Date _____
 Vice-Principal _____ Date _____
 Principal _____ Date _____

District Content Area Review Committee

Note: This course must be agendaized for Board approval. Return this signed form no later than _____.

Name/School <u>Brendan Goldman Elsie High School - M.A.H.</u>	Date <u>3/13/23</u>
Name/School <u>Petrea Huffman Montgomery High School</u>	Date <u>3/13/2023</u>
Name/School <u>[Signature] Santa Rosa High School</u>	Date <u>3/13/2023</u>
Name/School <u>[Signature] Maria Camillo's High School</u>	Date <u>3/15/23</u>
Name/School <u>Wendy Velle Piner High School</u>	Date <u>3/15/23</u>

District Office:
 Asst. Supt.,(or Designee) Educational Services, 7-12 *[Signature]* Date 3/17/23
 District Coordinator, Career Pathways (if applicable) _____ Date _____
 Board Subcommittee, Career Pathways (if applicable) _____ Date _____

Attach a response to the following issues, referring to the standards (where applicable) and framework for this course's subject area. Incomplete proposals will be returned. Be sure to include the appropriate item number and title (if an attachment is being provided).

NEEDS ASSESSMENT STATEMENT: Provide a rationale with specific evidence to support this course's inclusion in SRCS' Master Course Catalogue.

Four of the five comprehensive high schools in SRCS currently offer a Precalculus course at the honors level. These courses have a variety of titles (Trig/Precalc HP, Trigonometry HP and Precalculus HP) but are all the same course using the same text. They are a year-long course designed to help students that have completed Math 3 and continue their math education towards entrance into a Calculus course either at the college level or in the SRCS AP Calculus course.

The College Board has just developed an Advanced Placement course that fills the same role as our current Trig/Precalculus Honors courses. The first time the AP exam for the course will be offered is in May 2024 (next school year). By offering AP Precalculus in SRCS, students will have the opportunity to earn optional college credit by exam for coursework that many of our students are already doing in our existing Trig/Precalculus courses. This supports all of our students that plan to continue in post-secondary education by allowing the opportunity to earn college credit at a low cost, regardless if they plan to pursue a STEM degree. It also will allow students to continue on a Calculus pathway if they choose and still earn possible college credit even if they have not accelerated. Furthermore, the College Board anticipates that more students will feel prepared to attempt the AP Calculus BC exam (rather than the more common AP Calculus AB exam) after completing the AP Precalculus course as it includes some content that current Precalculus courses often omit (specifically more in-depth learning with Parametric Equations).

COURSE DESCRIPTION and DETAILED COURSE OUTLINE:

As with all Advanced Placement courses, the College Board has a specific and detailed scope and sequence that AP teachers are to follow in order to prepare students for the exam. The following information is from the College Board's course framework for AP Precalculus:

The AP Precalculus course framework provides a clear and detailed description of what students should know and be able to do to qualify for college credit or placement. The course framework includes two essential components:

Mathematical Practices

The mathematical practices are central to the study and practice of precalculus. Students should develop and apply the described skills on a regular basis over the span of the course. Each of the three mathematical practices for AP Precalculus have associated skills.

- *Practice 1: Procedural and Symbolic Fluency*
- *Practice 2: Multiple Representations*
- *Practice 3: Communication and Reasoning*

Course Content

The course content is organized into units of study that provide a suggested sequence for the course. These units comprise the content and conceptual understandings that colleges and universities typically expect students to master to qualify for college credit and/or placement.

- *Unit 1: Polynomial and Rational Functions*
- *Unit 2: Exponential and Logarithmic Functions*
- *Unit 3: Trigonometric and Polar Functions*
- *Unit 4: Functions Involving Parameters, Vectors, and Matrices*

COURSE AT A GLANCE:

Unit 1 Polynomial and Rational Functions 6–6.5 weeks

- 1.1 Change in Tandem*
- 1.2 Rates of Change*
- 1.3 Rates of Change in Linear and Quadratic Functions*
- 1.4 Polynomial Functions and Rates of Change*
- 1.5 Polynomial Functions and Complex Zeros*
- 1.6 Polynomial Functions and End Behavior*
- 1.7 Rational Functions and End Behavior*
- 1.8 Rational Functions and Zeros*
- 1.9 Rational Functions and Vertical Asymptotes*
- 1.10 Rational Functions and Holes*
- 1.11 Equivalent Representations of Polynomial and Rational Expressions*
- 1.12 Transformations of Functions*
- 1.13 Function Model Selection and Assumption Articulation*
- 1.14 Function Model Construction and Application*

Unit 2 Exponential and Logarithmic Functions 6–6.5 weeks

- 2.1 Change in Arithmetic and Geometric Sequences*
- 2.2 Change in Linear and Exponential Functions*
- 2.3 Exponential Functions*
- 2.4 Exponential Function Manipulation*
- 2.5 Exponential Function Context and Data Modeling*
- 2.6 Competing Function Model Validation*
- 2.7 Composition of Functions*
- 2.8 Inverse Functions*
- 2.9 Logarithmic Expressions*
- 2.10 Inverses of Exponential Functions*
- 2.11 Logarithmic Functions*
- 2.12 Logarithmic Function Manipulation*
- 2.13 Exponential and Logarithmic Equations and Inequalities*
- 2.14 Logarithmic Function Context and Data Modeling*
- 2.15 Semi-log Plots*

Unit 3 Trigonometric and Polar Functions 7–7.5 weeks

- 3.1 Periodic Phenomena*
- 3.2 Sine, Cosine, and Tangent*
- 3.3 Sine and Cosine Function Values*
- 3.4 Sine and Cosine Function Graphs*
- 3.5 Sinusoidal Functions*
- 3.6 Sinusoidal Function Transformations*
- 3.7 Sinusoidal Function Context and Data Modeling*
- 3.8 The Tangent Function*
- 3.9 Inverse Trigonometric Functions*
- 3.10 Trigonometric Equations and Inequalities*
- 3.11 The Secant, Cosecant, and Cotangent Functions*
- 3.12 Equivalent Representations of Trigonometric Functions*
- 3.13 Trigonometry and Polar Coordinates*
- 3.14 Polar Function Graphs*
- 3.15 Rates of Change in Polar Functions*

Unit 4 Functions Involving Parameters, Vectors, and Matrices 7–7.5 weeks

- 4.1 Parametric Functions*
- 4.2 Parametric Functions Modeling Planar Motion*
- 4.3 Parametric Functions and Rates of Change*
- 4.4 Parametrically Defined Circles and Lines*
- 4.5 Implicitly Defined Functions*
- 4.6 Conic Sections*
- 4.7 Parametrization of Implicitly Defined Functions*
- 4.8 Vectors*
- 4.9 Vector-Valued Functions*
- 4.10 Matrices*
- 4.11 The Inverse and Determinant of a Matrix*
- 4.12 Linear Transformations and Matrices*
- 4.13 Matrices as Functions*
- 4.14 Matrices Modeling Contexts*

STANDARDS-BASED INSTRUCTION: The course has been aligned to meet district-adopted content and performance standards in: (*check one*)

- English/Language Arts
- Mathematics
- Social Science
- Science

-OR-

The course is not a core class, but supports core curriculum standards by (*explain*):

The standards address math beyond the third high school year (Math 3 or Algebra 2) in terms of a Probability and Statistics course or a Calculus course. The standards specifically reference the College Board syllabi for these courses. This new College Board course will address what many schools have already in place; a course that fills a gap in the standards for students that have completed the third year high school course to further prepare students for entry to a Calculus course.

PREREQUISITES: List the prerequisites that must be met for entrance into the course (*must be aligned with district policy relating to prerequisites*).

Students must have passed Math 3 or equivalent with a D- or higher.

DESCRIBE PROGRAM NEEDS:

- **Personnel**

No new personnel needs beyond existing course needs.

- **Facilities**

No new facilities needs beyond existing course needs.

- **Textbook(s)**

- Yes, a new textbook is needed. Attach the *Textbook Recommendation Form* and a copy of the new textbook.

- No, the present textbook is adequate. Title: Precalculus with Limits: A Graphing Approach

- **Fiscal**

- List all costs needed to implement this course.

AP Course training for teachers (\$650–\$775 per teacher for 4 teachers = \$3100 maximum). No additional costs beyond current course needs.

➤ Funding source(s)

- Existing funding sources at site
- Additional funding sources required

FUTURE EXPANSION PROGRAM NEEDS: What problems would be encountered in replicating this course at another school?

This proposal is being written to approve the course for all sites. It may not apply at a site that participates in the International Baccalaureate (IB) program. Otherwise, there will be no future expansion needs other than the ongoing cost of training new teachers through the College Board’s AP professional development.

ADVANCED, HONORS, ADVANCED PLACEMENT, or INTERNATIONAL BACCALAUREATE: This item must be completed, if the course is identified with the distinction of Advanced, Honors, AP, or IB.

- How does this course exceed the requirements of a college preparatory course of its kind?

This course covers similar content as the existing Trig/Precalculus courses but its approval will allow students to earn optional college credits.

- Describe the end-of-course written assessment.

Teachers will determine end-of-course assessments similar to practices in current Trig/Precalculus courses however students will also have access to the AP Precalculus Exam administered through the College Board in May.

ADVANCED CAREER PATHWAY COURSES: Please identify the industry certification that students will be preparing to take or describe the culminating experience for the pathway that students will be completing as part of the coursework.