Pilot Course Proposal

Submitted by: Leah Dalrymple Building: LHS

Proposed Course Title: CWU College in the High School Precalculus 1

Grade Level: Any Department: Math

PLEASE ATTACH THE FOLLOWING:

Description of course content and how this course will meet current needs not being met by other courses. Description must also include the needs assessment data.

- Specifically, what will the student know and be able to do as a result of this course?

This is an intensive course where students will develop conceptual understanding as well as computational skills essential to the study of Calculus. Numerical, graphical, and algebraic approaches will be used to help students progress in developing analytical, critical reasoning, problem-solving, and communication skills.

Performance Skills

Students will be able to

- Recognize and represent functions verbally, numerically, graphically and algebraically, including linear, quadratic, polynomial, rational, root/radical/power, piecewise-defined, exponential, and logarithmic functions;
- Work with functional notation;
- Perform operations with functions: addition, subtraction, multiplication, division and composition;
- Analyze the algebraic structure and/or graph of a function to determine intercepts, domain, range, asymptotes, holes, maxima or minima, and turning points;
- Locate and determine graphical features of functions: intervals of increase and decrease, whether the function is one-to-one, whether the graph has symmetry (even/odd);
- Perform transformations of functions: translations, reflections, and stretching and shrinking;
- Solve a variety of equations, including linear, quadratic, polynomial, rational, root/radical/power, exponential, and logarithmic equations;
- Solve polynomial and rational inequalities graphically and algebraically;
- Find inverses of functions and understand the relationship of a graph of a function to that of its inverse;
- Use functions to model a variety of real-world problems.

Technology Skills

Students will be able to

- Use a graphing calculator to construct and analyze graphs of functions;
- Use a graphing calculator to extract numerical information regarding functions: function/expression values, roots/intercepts, maxima/minima, and points of intersection.

Upon completion of this course students will be able to meet the following Washington State _____K-12 Learning Standards:

- ***Standard 1:*** *The Complex Number System N-CN*
  Perform arithmetic operations with complex numbers
  Represent complex numbers and their operations on the complex plan
- ***Standard 2:*** *Seeing Structure in Expressions A-SSE*
  Interpret the structure of expressions

Write expression in equivalent forms to solve problems

- ***Standard 3:*** *Arithmetic with Polynomials and Rational Expressions A-APR*
  Perform arithmetic operations on polynomials
  Understand the relationship between zeros and factors of polynomials
  Use polynomial identities to solve problems
  Rewrite rational expressions
- ***Standard 4:*** *Creating Equations A-CED*
  Create equations that describe numbers or relationships
- ***Standard 5:*** *Interpreting Functions F-IF*
  Interpret functions that arise in applications in terms of a context
  Analyze functions using different representations
- ***Standard 6:*** *Building functions F-BF*
  Build a function that models a relationship between two quantities
  Build new functions from existing functions
- ***Standard 7:*** *Linear, Quadratic, and Exponential Models F-LE*
  Construct and compare linear, quadratic, and exponential models and solve problems

- What are the assessments that will be used to determine student achievement of the goals of this course? (Attach to this proposal.)

Students will be assessed using the CWU Math 153 final exam, in addition to regular tests and quizzes throughout the trimester.

Describe how this course will address:

- **Alignment with Common Core State Standards (CCSS) and/or WA State Essential Academic Learning Requirements (EALRs)**

Students will be able to

- Apply appropriate technology to solve problems;
- Model phenomena mathematically;
- Work cooperatively with others;
- Read and understand complex mathematical problems;
- Describe the methods used to approach a problem;
- Express solutions in written and oral form

*See other standards listed on p. 1-2

- **Integration of technology**

Students will be able to

- Use a graphing calculator to construct and analyze graphs of functions;
- Use a graphing calculator to extract numerical information regarding functions: function/expression values, roots/intercepts, maxima/minima, and points of intersection.

- **Infusion of diversity/multicultural perspectives - Yes**
- **Integration with other subject areas - Yes**
- **Provision of appropriate experiences for learners of varying abilities - Yes**
- **Development of higher level thinking and processing skills - Yes**
- **Articulation of scope and sequences across grades K-12. Will this course replace an existing curriculum? If so, which course?**

CWU College in the High School Precalculus 1 will replace Math Analysis B. Although some Math Analysis A/B topics will need to switch trimesters.

Current Scope and Sequence

See Math Analysis A/B in Canvas.

- Statement of impact: The course will better prepare students for college courses and offer an opportunity to receive college credit while remaining at LHS.

- Instructional materials and cost (include titles, names of publishers and copyright).

Materials will be the same as current Math Analysis/Trigonometry materials. No extra materials or costs.

SIGN-OFF FOR PILOT COURSE RECOMMENDATION

	Signature	**Date**

1. Department Head (Secondary) **Accepts ☐ Rejects ☐**	_____
2. Principal **Accepts ☐ Rejects ☐**	_____
3. District Content Facilitator **Accepts ☐ Rejects ☐**	_____
4. Curriculum Director **Accepts ☐ Rejects ☐**	_____

Return original to the Director of Curriculum and Instruction. Copies to Principal and Course Originator.

Pilot Course Proposal

Submitted by: Leah Dalrymple Building: LHS

Proposed Course Title: CWU College in the High School Precalculus 2

Grade Level: Any (upon completion of Precalculus 1) Department: Math

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PLEASE ATTACH THE FOLLOWING:

Description of course content and how this course will meet current needs not being met by other courses. Description must also include the needs assessment data.

- Specifically, what will the student know and be able to do as a result of this course?

This is an intensive course where students will develop conceptual understanding as well as computational skills essential to the study of Calculus. Numerical, graphical, and algebraic approaches will be used to help students progress in developing analytical, critical reasoning, problem-solving, and communication skills.

Performance Skills

Students will be able to:

- Define the six trigonometric functions in terms of right triangles and the unit circle;
- Express angles in both degree and radian measure and convert between those measures;
- Use, verify and prove trigonometric identities;
- Analyze the algebraic structure and/or graph of a trigonometric function to determine intercepts, domain, range, asymptotes, and turning points;
- Locate and determine features of trigonometric functions: amplitude, period, circular frequency, location of the midline, horizontal shift, intervals of increase and decrease, whether the function is one to one, and type of symmetry present (if any);
- Perform transformations of trigonometric functions;
- Use a graph or description of a sine or cosine type function to write a trigonometric function modeling the function;
- Represent trigonometric and inverse trigonometric functions verbally, numerically, graphically and algebraically;
- Solve a variety of trigonometric and inverse trigonometric equations (including finding exact values);
- Given a sector of a circle, be able to find arc length, the area of the sector, and the area of the circle segment;
- Find inverses of trigonometric functions and understand the relationship of a graph of a function to that of its inverse;
- Solve right and oblique triangles, including finding triangle area and solving application problems;
- Perform basic vector operations both graphically and algebraically—addition, subtraction, scalar multiplication, and dot product multiplication. (Time Permitting)
- Solve application problems using vectors. (Time Permitting)
- Convert points and equations between rectangular and polar form and solve polar equations. (Time Permitting)
- Graph parametric equations. (Time Permitting)
- Use time as a parameter in parametric equations for projectile motion. (Time Permitting)

Technology Skills

Students will be able to:

- Use a graphing calculator to construct and analyze graphs of trigonometric functions;
- Use a graphing calculator to extract numerical information regarding functions: function/expression values, roots/intercepts, maxima/minima, and points of intersection.

Upon completion of this course students will be able to meet the following Washington State _____K-12 Learning Standards:

- ***Standard 1:*** *Creating Equations A-CED*
  Create equations that describe numbers or relationships
- ***Standard 2:*** *Interpreting Functions F-IF*
  Interpret functions that arise in applications in terms of a context
  Analyze functions using different representations
- ***Standard 3:*** *Building functions F-BF*
  Build a function that models a relationship between two quantities
  Build new functions from existing functions
- ***Standard 4:*** *Trigonometric Functions F-TF*
  Extend the domain of trigonometric functions using the unit circle
  Model periodic phenomena with trigonometric functions
  Prove and apply trigonometric identities
- ***Standard 5:*** *Similarity, Right Triangles, and Trigonometry G-SRT*
  Define trigonometric ratios and solve problems involving right triangles
  Apply trigonometry to general triangles

What are the assessments that will be used to determine student achievement of the goals of this course? (Attach to this proposal.)

Students will be assessed using the CWU Math 154 final exam, in addition to regular tests and quizzes throughout the trimester.

Describe how this course will address:

- **Alignment with Common Core State Standards (CCSS) and/or WA State Essential Academic Learning Requirements (EALRs)**

Students will be able to

- Apply appropriate technology to solve problems;
- Model phenomena mathematically;
- Work cooperatively with others;
- Read and understand complex mathematical problems;
- Describe the methods used to approach a problem;
- Express solutions in written and oral form.

*See other standards listed above.

- **Integration of technology**

Students will be able to:

- Use a graphing calculator to construct and analyze graphs of trigonometric functions;
- Use a graphing calculator to extract numerical information regarding functions: function/expression values, roots/intercepts, maxima/minima, and points of intersection.

- **Infusion of diversity/multicultural perspectives - Yes**
- **Integration with other subject areas - Yes**
- **Provision of appropriate experiences for learners of varying abilities - Yes**
- **Development of higher level thinking and processing skills - Yes**
- **Articulation of scope and sequences across grades K-12. Will this course replace an existing curriculum? If so, which course?**

CWU College in the High School Precalculus 2 will replace Trigonometry. The content will be the same; the main difference is the name and the potential to earn college credit.

Current Scope and Sequence

See Trigonometry in Canvas.

- Statement of impact: The course will better prepare students for college courses and offer an opportunity to receive college credit while remaining at LHS.

- Instructional materials and cost (include titles, names of publishers and copyright).

Materials will be the same as current Math Analysis/Trigonometry materials. No extra materials or costs.

SIGN-OFF FOR PILOT COURSE RECOMMENDATION

	Signature **Date**
1. Department Head (Secondary) **Accepts ☐ Rejects ☐**	_____
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Return original to the Director of Curriculum and Instruction. Copies to Principal and Course Originator.