University of Wisconsin
GREEN BAY

Kiel High School
CCIHS
Math 104
Pre-Calculus

4 undergraduate credit hours
Semester 2 2020
Block 5-Room 159- 1:37-3:00pm MTWThF

Instructor: Mrs. Meyer
Email Address: wmeyer@kiel.k12.wi.us
School Phone: (920) 894-2263
Times Available for extra help: 7:00am-7:50am, 3:00-4:00pm, and prep time

This class is a dual credit class in collaboration with the University of Wisconsin-Green Bay. Students at Kiel High School may choose to enroll for UWGB credits in addition to high school credit. This creates a college transcript; therefore, it creates a GPA for you which is permanent.

**Course Description:** Topics in this course include: Functions and their graphs, the algebra of functions, polynomial functions, rational functions, exponential and logarithmic functions, trigonometric functions, analytic trigonometry, and conic sections.

**Prerequisite:** Algebra 2 with at least a B grade (instructor verified) or Placement Exam scores of: WPT-MFND score >465 and WPT-AALG score >525 and WPT-TAG score 150-525.

**Course Learning Outcomes/Learning Targets**

<table>
<thead>
<tr>
<th>Unit</th>
<th>Student Learning Outcomes-I can…</th>
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</table>
| 1    | ● Explore different ways in which mathematics is used to model real-world data  
      | ● Explore the idea of a function and give the math definition of a function  
      | ● Investigate the concepts of graphing functions  
      | ● Establish properties of functions including increasing/decreasing and min/max  
      | ● Find the rate at which the values of a function change |
| 2 | • Explore how transformations of a function affects its graph using reflecting, shifting, and stretching  
   • Find different ways to combine functions to make new functions  
   • Solve inverse functions and identify one-to-one functions |
| 3 | • Analyze quadratic functions  
   • Explore properties polynomial functions and apply to their graphs  
   • Find factors of polynomials by dividing algebraically  
   • Describe real zeros of polynomials using algebraic and graphical methods  
   • Analyze rational functions and connect to transformations |
| 4 | • Explore exponential functions and their graphs  
   • Evaluate the natural exponential function and its applications  
   • Establish logarithmic functions using the inverses of exponential functions  
   • Apply the properties of logarithms  
   • Establish exponential and logarithmic equations  
   • Explore models of exponential and logarithmic functions |
| 5 | • Explore some properties of the unit circle  
   • Use properties of the unit circle to define the trigonometric functions  
   • Analyze the sine and cosine function graphs and their transformations  
   • Establish the other trig function graphs and their transformations  
   • Evaluate the inverse trig functions and their graphs |
| 6 | • Identify and simplify trigonometric identities  
   • Derive identities for trigonometric functions of sums and differences  
   • Apply trig identities to basic trigonometric equations |
| 7 | • Explore the basic conic sections and review circle equations  
   • Use characteristics of parabolas to graph and find equations  
   • Find the equations and characteristics of ellipses  
   • Explore the hyperbola and its properties to graph and write equations  
   • Apply conic sections to real-world situations using shifts of conic sections and basic conic sections |
| 8 | • Define and use sigma notation  
   • Find arithmetic sequences and apply to sigma notation  
   • Find geometric sequences and apply to sigma notation  
   • Apply the binomial theorem to sequences and series |
| 9 | • Describe directed quantities using vectors  
   • Define and use the dot product in vector problems  
   • Apply properties of vectors in two-dimensions to three-dimensions |
| 10 | • Define polar coordinates and relate to rectangular coordinates  
   • Establish graphs of polar equations  
   • Explore parametric functions and equations |

**Homework:** Homework assigned is crucial to the learning process in this course. It is important that you work through all assigned problems, and do extra practice problems as needed. Homework will be in the form of book problems, worksheet problems, and Desmos activities. Late homework will not be accepted, unless you are...
absent from class, in which case you will be given time to complete the homework. Reviewing will be part of what we will do often, to help you learn and retain the information. There will not be any “extra credit” offered in this course.

**Quizzes and Exams:** Quizzes will be given during some units, and an exam will be given at the end of each unit. A final exam will be given at the end of the course as well. Quizzes will be short and used to inform instruction and what you will need to work on yet. Exams will be longer and will be used as a summative assessment. Graphing calculators will be allowed on some portions of the exams and quizzes (TI-83 or TI-84 are acceptable). There will also be no-calculator portions of the exams and quizzes. No other electronic devices will be allowed.

**Class Preparation:** Bring a notebook, your graphing calculator, your textbook, and chromebook to class everyday. There may be instances where using Desmos may be beneficial to helping you understand some of the concepts being presented.

**Grading Policies**
Formative Assessments (Quizzes, homework, and class activities)- 20%
Summative Assessments (Quizzes, Unit Exams, Projects, and Final Exam)- 80%

**UWGB Grading Scale** is as follows:

<table>
<thead>
<tr>
<th>Letter Grade</th>
<th>Text</th>
<th>Grade Points per credit</th>
<th>Percent</th>
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<tbody>
<tr>
<td>A</td>
<td>Excellent</td>
<td>4.0</td>
<td>92-100%</td>
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<tr>
<td>AB</td>
<td>Very Good</td>
<td>3.5</td>
<td>89-91%</td>
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<td>B</td>
<td>Good</td>
<td>3.0</td>
<td>82-88%</td>
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<td>BC</td>
<td>Above Average</td>
<td>2.5</td>
<td>79-81%</td>
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<tr>
<td>C</td>
<td>Average</td>
<td>2.0</td>
<td>72-78%</td>
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<tr>
<td>CD</td>
<td>Below Average</td>
<td>1.5</td>
<td>69-71%</td>
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<tr>
<td>D</td>
<td>Poor</td>
<td>1.0</td>
<td>60-68%</td>
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<tr>
<td>F</td>
<td>Unacceptable</td>
<td>0.0</td>
<td>0-59%</td>
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**Learning Resources**
Required Textbook: *Precalculus: Mathematics for Calculus, 6th edition; James Stewart, Lothar Redlin, & Saleem Watson; Brooks/Cole Cengage Learning*
## Course Schedule & Outline
Assignments for each section will be posted on a google calendar, which will be shared with you at the beginning of the course.

<table>
<thead>
<tr>
<th>Week</th>
<th>Unit Topic</th>
<th>Textbook Topics/Quizzes/Unit Exams</th>
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</table>
| 1 & 2   | 1 Functions-Part 1            | - Fitting Lines to Data  
- What is a Function?  
- Graphs of Functions  
- Quiz  
- Getting Information from the Graph of a Function  
- Average Rate of Change of a Function  
- Unit Exam |
| 3 & 4   | 2 Functions-Part 2            | - Transformations of Functions  
- Combining Functions  
- One-to-One Functions  
- Unit Exam |
| 5 & 6   | 3 Polynomial and Rational Functions | - Quadratic Functions and Models  
- Polynomial Functions and their Graphs  
- Dividing Polynomials and Real Zeros of Polynomials  
- Rational Functions  
- Unit Exam |
| 7 & 8   | 4 Exponential and Logarithmic Functions | - Exponential Functions  
- The Natural Exponential Function  
- Quiz  
- Logarithmic Functions  
- Law of Logarithms  
- Exponential and Logarithmic Equations  
- Modeling with Exponential and Logarithmic Functions  
- Unit Exam |
| 9 & 10  | 5 Trigonometric Functions     | - The Unit Circle  
- Trigonometric Functions of Real Numbers  
- Quiz  
- Trigonometric Graphs  
- More Trigonometric Graphs  
- Inverse Trigonometric Functions and their Graphs  
- Unit Exam |
| 11 & 12 | 6 Analytic Trigonometry       | - Trigonometric Identities  
- Addition/Subtraction Formulas  
- Trigonometric Equations  
- Unit Exam |
| 13 & 14 | 7 Conic Sections              | - Circles  
- Parabolas  
- Ellipses  
- Hyperbolas  
- Shifted Conics |
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<tr>
<th>Unit Exam</th>
<th>15</th>
<th>8</th>
<th>Sequences and Series-Review</th>
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<td>• The Binomial Theorem</td>
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<td>Vectors in Two and Three Dimensions</td>
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<td>** If time Permits:</td>
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<td>Polar and Parametric Equations</td>
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<td>• Polar Coordinates</td>
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<td>18</td>
<td>Review and Final Exam</td>
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**UWGB Academic Integrity**
As stated from the UWS 14.01 Statement of principles, “The Board of Regents, administrators, faculty, academic staff and students of the University of Wisconsin System believe that academic honesty and integrity are fundamental to the mission of higher education and of the University of Wisconsin System. The university has a responsibility to promote academic honesty and integrity and to develop procedures to deal effectively with instances of academic dishonesty. Students are responsible for the honest completion and representation of their work, for the appropriate citation of sources, and for respect of others' academic endeavors. Students who violate these standards must be confronted and must accept the consequences of their actions.” The entirety of the Student Academic Disciplinary Procedures can be located at https://docs.legis.wisconsin.gov/code/admin_code/uws/14

These procedures state that if there is any academic dishonesty of your academic work, there are consequences that can become part of your permanent college record.

**UWGB Drops and Withdrawals**
For information on drops and withdrawals, please refer to the UW Green Bay folder provided to you.