**Course Content**

Textbook: PreCalculus from publisher Glencoe McGraw-Hill. There is an e-book available as an alternative. Copyright date is 2014.

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**Optional College Credit for this course:**

 For a fee, five (5) hours of college credit is available through the University of Missouri - St. Louis (you should check with receiving schools as to whether they accept this transfer credit).   It is always up to the receiving institution as to whether credit will be accepted for transfer credit or not.  Registration for UMSL credit for this course usually takes place online in January and is subject to very strict deadlines. These deadlines are set by the university and required by the Coordinating Board for Higher Education (CBHE). Credit must be paid for during the semester the student is enrolled in the class. Retroactive credit can’t be granted. Please visit the UMSL Advanced Credit website is [www.umsl.edu/acp](http://www.umsl.edu/acp) for current prices and deadlines.

**UMSL Course Description**

Math 1045:  Topics in this course include factoring, simplifying rational functions, functions and their graphs, solving linear and nonlinear equations, polynomial functions, inverse functions, the binomial theorem, logarithms, exponentials, solutions to systems of equations using matrices, solutions to nonlinear systems of equations, and sequences.  Students will also study trigonometric and inverse trigonometric functions with emphasis on trigonometric identities and equations.

This course is available to students who meet the criteria for dual credit at the University of Missouri St. Louis.  When you successfully complete this course with a “C” or above you will have earned three college credit hours if you have enrolled with the University of Missouri St. Louis.  You can enroll for the course online at [www.umsl.edu/acp](http://www.umsl.edu/acp).

This is a year-long class and it is anticipated that the following chapters from the textbook will be covered:

* Chapter 1 – Functions from a Calculus Perspective – Sections 1-7
* Chapter 2 – Power, Polynomial, and Rational Functions – Sections 1-6
* Chapter 3 – Exponential and Logarithmic Functions – Sections 1-5
* Chapter 4 – Trigonometric Functions – Sections 1-4, 6-7
* Chapter 5 – Trigonometric Identities and Equations – Sections 1-5
* Chapter 6 – Systems of Equations and Matrices – Sections 1-5
* Chapter 7 – Conic Sections and Parametric Equations – Sections 1-3
* Chapter 8 – Vectors – Sections 1-3
* Chapter 9 – Polar Coordinates and Complex Numbers – Sections 1-3, 5
* Chapter 12 – Limits and Derivatives – Sections 1-5

**What the students will learn in this course:**

* How to find zeros and graphs of polynomial functions.
* Understand solving linear, quadratic, absolute value, radical, and other types of equations.
* Learn polynomial division, remainder and factor theorem, and zeros of theorems.
* Applying the concept of logarithms and exponential functions
* Evaluate Trigonometric functions; Find the inverse of trigonometric functions.
* Solve trigonometric equations, graph trigonometric functions, and verify trigonometric Identities.
* Solve triangles using the law of Sine and the law of Cosine.
* Work with  functions in  polar coordinates
* Solve systems of linear equation using  matrices and determinants to solve linear systems of equations
* Work with sequences and summation notation,   recognize and do calculations involving arithmetic and geometric series.
* Use the binomial theorem and Pascal’s triangle to expand binomials in positive integer powers.
* Proof by Induction.

**Classroom Protocol**

* Students are expected to bring their books or have access to their book every class, to have a charged BYOD for every class, to have a TI-84 calculator, and to have a notebook for this class only. I give out a lot of paper and you are expected to have all your notes throughout the semester.
* During class you are expected to work with a partner or group. You may choose your seats but it is with the expectation that you are working with your partner. If this is not the case you will be moved to a new seat.
* Cellphones are not allowed in class. If you caught with a cellphone, it will be taken away and given to Mr. Johnson.
* This class is offered for college credit through UMSL and will be treated like a college course. If we finish a lesson we will move along to the next lesson that day. All class time will be utalized.

**Open Labs**

Open labs are used to enhance the chapter. They will cover lessons or topics that we do not have time to cover in class. They are expected to be done in a math open lab.

**Summative Assessments**

Summative Assessments come in the form of homework, quizzes, ACT prep questions, and open labs.

* Homework will be collected the class day after the lesson is completed. All even problems will be graded for accuracy, all odd problems will be graded for completion. Because of this all even problem answers are expected to be highlighted. Homework is always out of 10 points. Each even is worth one point and the odds will make up the rest of the points.
* ACT Prep questions are attached to every homework assignment. They will be graded separately. They are worth 2-4 points.
* Quizzes are worth double the amount of homework assignments that are being covered in the quiz. (example if the quiz covers three lessons it will be out of 60 points).

**Summative Assessments**

Summative assessments come in the form of tests and projects.

* Tests will always be put into powerschool as double the quiz scores for the lap. The test itself may be out a different point value based on the amount of questions. Your grade will be based on your percentage.
* Test cannot be taken unless all summative assessments are turned in.
* You will have one project a semester. It will be worth 200 points.

**Grading Scale**

|  |  |
| --- | --- |
| A+ | 97 - 100 |
| A | 93 - 96 |
| A- | 90 - 92 |
| B+ | 87 - 89 |
| B | 83 - 86 |
| B- | 80 – 82 |
| C+ | 77 – 79 |
| C | 73 – 76 |
| C- | 70 – 72 |
| D+ | 67 - 69 |
| D | 65 – 66 |
| F | 64 and below |

**Grading for UMSL**

Your grade for UMSL will consist of your first semester grade before the final, your second semester grade before the final, and an average of your two final grades.

**Absences**

If you are absent from one day of class your formative assessments are due the next class day. If it is not turned in the assignment will be considered late. If you are absent and miss a test in the testing center you are expected to make it up with in 2 class days.

**Final Exam**

* The final exam for each semester is comprehensive and is worth 15% of the semester grade.
* If a student scores 85% or higher on the final exam, the lowest test score completed will be dropped.
* There will be a final exam given each semester.

**Grade Notification**

* Grades are updated regularly on PowerSchool. Please check there for the actual grade and notify me if you see a discrepancy.

**Contact information**

If you need me you can email me at kalbertson@iwacademy.org, come to an open lab time, or call me at (314) 725-5850 ext #1146.

**Tentative Schedule**

|  |  |
| --- | --- |
| **Chapter/Section** | **Topic** |
| Section 1-1 | Functions |
| Section 1-2 | Analyzing Graphs of Functions and Relations |
| Section 1-3 | Continuity, End Behavior, and Limits |
| Section 1-4 | Extrema and Average Rates of Change |
|  | Quiz |
| Section 1-5  | Parent Functions and Transformations |
| Section 1-6  | Function Operations and Composition of Functions  |
| Section 1-7 | Inverse Relations and Functions |
|  | Test |
| Section 2-1 | Power and Radical Functions |
| Section 2-2 | Polynomial Functions |
| Section 2-3  | The Remainder and Factor Theorem |
|  | Quiz |
| Section 2-4  | Zeros of Polynomial Functions |
| Section 2-5 | Rational Functions |
| Section 2-6 | Nonlinear Inequalities |
|  | Test |
| Section 3-1 | Exponential Functions |
| Section 3-2 | Logarithmic Functions  |
| Section 3-3 | Properties of Logarithms |
|  | Quiz |
| Section 3-4 | Exponential and Logarithmic Equations |
| Section 3-5 | Modeling with Nonlinear Regression |
|  | Test |
| Section 4-1 | Right Triangle Trigonometry |
| Section 4-2 | Degrees and Radians |
| Section 4-3 | Trigonometric Functions on a Unit Circle |
| Section 4-4 | Graphing Sine and Cosine Functions |
|  | Quiz |
| Section 4-6 | Inverse Trigonometric Functions |
| Section 4-7 | The Law of Sines and the Law of Cosines |
|  | Test |
| Semester 1 Final |
| Section 5-1 | Trigonometric Identities |
| Section 5-2 | Verifying Trigonometric Identities |
| Section 5-3 | Solving Trigonometric Equations |
|  | Quiz |
| Section 5-4 | Sum and Difference Identities |
| Section 5-5 | Multiple-Angle and Product-to-Sum Identities |
|  | Test |
| Section 6-1 | Multivariable Linear Systems and Row Operations |
| Section 6-2 | Matrix Multiplication, Inverses, and Determinants |
| Section 6-3 | Solving Linear Systems Using Inverses and Cramer’s Rule |
|  | Quiz |
| Section 6-4 | Partial Fractions |
| Section 6-5 | Linear Optimization |
|  | Test |
| Section 7-1 | Parabolas |
| Section 7-2 | Ellipses and Circles |
| Section 7-3 | Hyperbolas |
|  | Test |
| Section 8-1 | Introduction to Vectors |
| Section 8-2 | Vectors in the Coordinate Plane |
| Section 8-3 | Dot Products and Vector Projections |
|  | Test |
| Section 9-1 | Polar Coordinates |
| Section 9-2 | Graphs of Polar Equations |
| Section 9-3 | Polar and Rectangular Forms of Equations |
|  | Quiz |
| Section 9-5 | Complex Numbers and DeMoivre’s Theorem |
|  | Test |
| Section 12-1 | Estimating Limits Graphically |
| Section 12-2 | Evaluating Limits Algebraically |
| Section 12-3 | Tangent Lines and Velocity |
| Section 12-4 | Derivatives |
|  | Test |
| Semester 2 Final |