

Math 135 - College Now Syllabus

SMSU Course Title: PreCalculus

SMSU Faculty Mentor: Dr.Undupitiya Wijesiri

High School: Waterville-Elysian-Morristown

High School Teacher: Mrs. Janet Jones

Semester and Year: FULL YEAR: 2020-2021 (Sem I and Sem II)

Text: Ron Larson, (2014), *Prealculus*, 9th Edition, Brooks and Cole. (Or other approved text.)

Course Description:

A detailed study of the mathematics needed for calculus. Concepts are presented and explored from symbolic, graphical, and numerical perspectives. Basic concepts covered include polynomial, rational, exponential, logarithmic, and trigonometric functions, complex numbers, linear systems, numerical patterns, sequences and series. The required preparation is MATH 110 or three years of high school mathematics, including two years of algebra.

Learning Outcomes:

Upon completion of this course students will:

1. Be able to set up and solve algebraic, logarithmic, exponential, and trigonometric equations.
2. Be able to graph algebraic, logarithmic, exponential and trigonometric functions and interpret said graphs.
3. Be able to prove algebraic and trigonometric identities and read said proofs.
4. Be able to solve linear and nonlinear systems.
5. Be able to read, understand and work with sequences and series.

Minnesota Transfer Curriculum Goal 04 - Mathematical/Logical Reasoning:

1. Illustrate historical and contemporary applications of mathematical/logical systems.
2. Clearly express mathematical/logical ideas in writing.
3. Explain what constitutes a valid mathematical/logical argument (proof).
4. Apply higher-order problem solving and/or modeling strategies.

Prerequisites:

In order to be ready for the content of this course, students should have previously covered the following topics.

- a. Real Numbers
- b. Exponents and Radicals
- c. Polynomials and Factoring
- d. Rational Expressions
- e. Coordinate Systems

Major Content Areas:

1. Equations and Inequalities
 - a. Linear Equations, Graphs, and Applications
 - b. Quadratic Equations and Applications
 - c. Complex Numbers
 - d. Other Types of Equations
 - e. Inequalities
2. Functions and Graphs
 - a. Functions
 - b. Graphs of Functions
 - c. Parent Functions
 - d. Transformation of Functions
 - e. Composite and Inverse Functions

3. Polynomial Functions
 - a. Quadratic Functions
 - b. Higher Order Polynomial Functions
 - c. Division of Polynomials
 - d. Zeros of Polynomials
 - e. Applications
4. Rational Functions
 - a. Rational Functions and Asymptotes
 - b. Graphs of Rational Functions
5. Exponential and Logarithmic Functions
 - a. Exponential Functions and Graphs
 - b. Logarithmic Functions and Graphs
 - c. Properties of Logarithms
 - d. Exponential and Logarithmic Equations and Applications
6. Trigonometry
 - a. Degree and Radian Measures
 - b. Definitions of the Trigonometric Functions
 - c. Standard Trigonometric Identities (Recognition, Use, and Proof)
 - d. Graphs of Trigonometric Functions
 - e. Inverse Trigonometric Functions
 - f. Law of Sines
 - g. Law of Cosines
 - h. Heron's Area Formula
 - i. Applications of Trigonometry to Real-Life Problems
7. Systems of Equations and Matrices
 - a. Linear and Nonlinear Systems of Equations
 - b. Two Variable Linear Systems
 - c. Multivariable Linear Systems
 - d. Applications of Systems to Real-Life Problems
8. Sequences and Series
 - a. Sequence and Series Notation
 - b. Factorials
 - c. Summations
 - d. Arithmetic and Geometric Sequences
 - e. Infinite Sums
9. Additional Topics if Time Permits
 - a. Matrices
 - b. Solving Linear Systems using Matrices
 - c. Elementary Matrix Row Operations
 - d. Gaussian and Gauss-Jordan Elimination
 - e. Determinants and Cramer's Rule
 - f. Inverses of Matrices
 - g. Vectors
 - h. Polar Coordinates
 - i. Conic Sections

Grades: Final grades will be based on the following percentages.

Homework, attendance, and participation $\leq 15\%$

Quizzes, tests, and final exam $\geq 85\%$

Late homework will receive a 25% deduction for 1 day late, a 50% deduction for 2 days late and no credit for 3 or more days late.

Attendance Policy: Daily attendance is required. Students will take an alternate exam, if absent on a class exam day. There will be no alternate final exam given.

Tentative Semester Schedule: Semester 1: Chapters 1-4; Semester 2 Chapters 5-7, 9, 10.

Final Exam: The final exam will be cumulative and given during the final exam period for this class (in May 2021).

Liberal Education Student Learning Outcomes:

Upon completion of the Liberal Education Program at SMSU, students will:

- Understand the techniques and habits of thought in a variety of liberal arts disciplines, having attained an adequate foundation of knowledge in those disciplines.
- Communicate effectively.
- Be creative thinkers able to identify, formulate, and solve problems using interdisciplinary perspectives.
- Be critical thinkers who evaluate information wisely and examine how assumptions and positions are shaped.
- Understand both physical and social aspects of the world and their place in it.
- Embrace the similarities among peoples and appreciate the diversity that enriches the human experience.
- Analyze moral judgments and engage in moral discourse.
- Practice responsible citizenship in their local and global communities.
- Continue life-long learning.
- Integrate mind, body, and spirit, the essential elements of a flourishing life.

College Now Statement:

College Now is SMSU's concurrent enrollment program. Concurrent enrollment allows qualified high school students to earn college credit in their high school, during their regular school day. College Now classes are taught by qualified high school teachers and are supervised by SMSU faculty members. These classes are actual SMSU courses where students earn actual SMSU credit. There is no cost to the student for these courses, providing an outstanding opportunity for students to earn college credit and jumpstarting their college careers without incurring additional debt.

Academic Honesty:

The aim of the academic honesty policy is to maintain the academic integrity of Southwest Minnesota State University and promote an intellectual climate of honesty and integrity. To maintain an environment of academic integrity all students are required to accept personal responsibility for their work at Southwest Minnesota State University. Any offense against the academic honesty policy compromises the educational integrity of Southwest Minnesota State University and will be considered a grave offense. Offenses against academic honesty are acts which unjustly advance one's academic standing at Southwest Minnesota State University and include knowingly permitting or knowingly aiding a person in an offense against the academic policy.

Plagiarism: Presenting someone else's work or ideas as your own. Plagiarism will include, but not be limited to:

1. Submitting someone else's work or ideas as your own, including but not limited to homework assignments, term papers, research reports, lab reports, group projects, artistic works, tests, or class presentations.
2. Submitting someone else's electronic work as your own, including but not limited to video clips, audio clips, electronic files, electronic programs, and any other copied electronic page, document, article, review, etc.
3. Submitting someone else's work as your own with minor alterations. Paraphrasing without proper citation is also plagiarism.
4. Submitting someone else's work without appropriate use of quotations, paraphrases, footnotes, or references.