

## UAF & DMS SYLLABUS GUIDELINES FOR MATH 122X - COLLEGE ALGEBRA FOR BUSINESS, ECONOMICS, LIFE AND SOCIAL SCIENCES

Across all sections of Math 122X offered by UAF campuses (delivered in person or online), all syllabi must satisfy the following requirements.

1. General guidelines set by UAF; follow this link to the [UAF syllabus requirements](#)
2. Content *Finite Mathematics and Applied Calculus*, 7<sup>th</sup> edition by Waner and Costenoble is the textbook adopted by DMS and must be used for this course.
  - Chapter 0: 0.1-0.8 (r)
  - Chapter 1: 1.1-1.4 (r)
  - Chapter 2: 2.1-2.4 (r), (quadratic regression optional in 2.1)
  - Chapter 3: 3.1-3.3 (r)
  - Chapter 4: 4.1-4.3 (r)
  - Chapter 6: 6.1-6.2 (r)

### 3. Timing of material

For each of the following, the minimum time spent on the sections is listed. This is also a suggested outline with three exams, Modifications to this can be made if only giving two exams.		
Section	Topic	Approx. timing
0.1	Real Numbers	$\frac{1}{2}$ day
0.1	Exponents and Radicals	$\frac{1}{2}$ day
0.3	Algebraic Expressions	$\frac{1}{2}$ day
0.4	Rational Expressions	$\frac{1}{2}$ day
0.5	Polynomial Equations	$\frac{1}{2}$ day
0.6	Miscellaneous Equations	$\frac{1}{2}$ day
0.7	The Coordinate Plane	1 day
0.8	Logarithms	1 day
1.1	Functions from the Numerical, Algebraic, and Graphic Viewpoints	1 day
1.2	Functions and Models	$2\frac{1}{2}$ -3 days
1.3	Linear Functions and Models	2 days
1.4	Linear Regression	1 day
Exam over Chapters 0 and 1		
2.1	Quadratic Functions and Models	2 days
2.2	Exponential Functions and Models	2 days
2.3	Logarithmic Functions and Models	2 days
2.4	Logistic Functions and Models	1 day
3.1	Simple Interest	1 day
3.2	Compound Interest	1 day
3.3	Annuities, Loans, and Bonds	2 days
Exam over Chapters 2 and 3		
4.1	Systems of Two Equations in Two Unknown	1 day
4.2	Using Matrices to Solve Systems of Equations	2 days
4.3	Applications of Systems of Linear Equations	2 days
6.1	Graphing Linear Inequalities	1 day
6.2	Solving Linear Programming Problems	2 days
Possible Third Exam over Chapters 4 and 6		
Ch 1-6	Review	1-3 days
Ch 1-6	Final Exam	

### 4. Types of Assessments

- Exams
  - at least two exams during the semester
  - exams must be timed, proctored, closed book, closed notes
  - use of calculators is allowed in this course but not for content in Ch 0 or 1
  - exams must be majority written answer (not multiple choice)
  - exams must be paper-and-pencil exams, written and graded by faculty members
  - exams should not be reused from previous semesters, limited reuse of edited problems is acceptable
- Final Exam
  - must be cumulative and representative of the entire course
  - must include problems from each Assessment Criteria listed on the next page
  - Students are expected to know on their own (no formulas provided on the test for the following):
    - \* equation of lines formulas
    - \* quadratic formula
    - \* exponential and logarithmic properties
    - \* simple and compound interest formulas
- Other Assessed Work
  - instructors should provide written feedback to students approximately weekly throughout the semester. This can be through humanly-graded assignments or email correspondence

## 5. Grading Policy

- The syllabus must include a grading scale of some form.
- Plus/minus grading is at the discretion of the instructor, but must be stated explicitly.
- The final grade in this course must adhere to the following:

Written Assessed Work	At least 15% and at most 30%
Online Assessed Work	At most 15%
Midterm Exams	At least 40%
Comprehensive Final Exam	At least 20%

## 6. Tutoring Services

- DMS Math and Stat Lab: If students need extra help, there is free tutoring available. The Math and Stat Lab is located in CHAP 305 and is staffed by Math Graduate students, upper-division Math students and Math faculty. This lab operates on a walk-in basis and is open Monday -Saturday. Please check the department web page for current semester times.
- DMS One-on-one Tutoring: Free tutoring by appointment. This service is available to any UAF student registered in an core MATH or STAT course. Tutoring is available in Eielson 302, Monday -Friday and students can sign up for an appointment at <https://1-1tutoring.youcanbook.me/>
- DMS Online Tutoring: Free tutoring by appointment. This service is available to any UAF student registered in an distance delivered DMS MATH or STAT course. Tutoring is available through Blackboard Collaborate and students can sign up for an appointment at <https://online-tutoring.youcanbook.me/>

## Assesment Criteria

Final exams should contain problems that demonstrate the students' acquired knowledge of the following topics.

- Fundamentals- Algebra
  - simplify algebraic expressions involving negative and fractional exponents, compound fractions, and rational expressions
  - solve a problem using modeling with equations (eg. area, length, mixtures, distance, or rate)
- Functions
  - evaluate a function at a given point

- evaluate a difference quotient
  - express with proper notation
  - find the domain and range
  - find the average rate of change - from graph or from equation
- Graphs
  - find domain and range
  - find intercepts
  - identify intervals where the function is increasing or decreasing
- Be able to find the average rate of change of a function
- Transformations of Functions
- Combinations of Functions
- Composition of Functions
- Inverse Functions
  - find domain and range
  - find the equation of an inverse
  - graph an inverse function
- Quadratic Functions
  - graph a quadratic given an equation
  - identify the max/min value
  - modeling with quadratics
- Polynomial Functions
  - graph by finding zeros and identifying end behavior
  - identify the equation from a graph
  - graph a rational function by identifying intercepts and asymptotes
- Exponential Functions
  - graph a transformed exponential function
  - identify the equation of a graph of an exponential function
- Logarithmic Functions
  - graph a transformed logarithmic function
  - use laws of logarithms to evaluate, combine or expand logarithmic expressions
- Exponential and Logarithmic Equations
  - Solve various types of exponential and logarithmic equations algebraically
  - modeling with exponential functions
- Systems of Equations
  - solve a system of linear equations in 2 or 3 variables
  - solve a system of non-linear equations
  - graph a system of inequalities
  - find the min/max of an objective function for a system of inequalities

- Finance
  - include at least two of the following
    - \* use the compound interest formula to find future value, present value, and/or time
    - \* use the continuously compounded interest formula to find future value, present value, and/or time
    - \* find the future value or present value of an annuity
    - \* find the amortization payment or amount amortized for a loan
  - include at least one of the following
    - \* find the  $n$ th term of an arithmetic or geometric progression
    - \* find the finite and infinite sum of a geometric progression