UAF & DMS SYLLABUS GUIDELINES FOR MATH151X – COLLEGE ALGEBRA FOR CALCULUS

Across all sections of MATH151X 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 UAF syllabus requirements
2. Content
   - *Precalculus* by Stewart, Redlin, and Watson, 7th edition is the textbook adopted by DMS and must be used for the course.
   - All of the required sections from the textbook listed below must be covered.
     - Chapter 1: 1.1-1.5, 1.7-1.10
     - Chapter 2: 2.1-2.4, 2.6-2.8
     - Chapter 3: 3.1-3.4, 3.6
     - Chapter 4: 4.1- 4.6
     - Chapter 10: 10.1-10.2, 10.8-10.9
     - Chapter 11: 11.2-11.4
     - Chapter 12: 12.1-12.3
3. Prerequisites
   - Placement into MATH151X by the UAF Math Placement. Students who have not met the current placement requirements will be dropped within the first two weeks of the course.
   - Any student who has previously received a D, W or F in MATH151X must have received a P in MATH151R or must be concurrently enrolled in MATH151S. Students in this situation who have not met one of these conditions will be dropped from the course.
4. Types of assessments
   - Exams
     - at least two midterm exams during the semester
     - exams must be timed, proctored, closed book, closed notes, and no calculators.
     - exams must be majority written answer (not multiple choice)
     - exams must be pencil-and-paper exams, written and graded by a faculty member
     - 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 of the Assessment Criteria listed on the next page
     - must include problems that demonstrate ability to express proper notation
     - instructors must choose one of the following options (1) students must score at least 60% on the final exam to receive a C- or better in the course. or (2) the final exam must be worth at least 25% of the final grade in the course
   - 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.
     - students must have a mechanism for estimating their current grade in the course
     - there must be human feedback prior to the first exam
5. Grading Policy
   - The syllabus must include a grading scale in 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%

Assessment 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 - include at least two of the following
  - evaluate a difference quotient
  - find the domain and range of a function and identify intervals on which the function is increasing or decreasing
  - find the average rate of change - from graph or from equation
- Graphing
  - graph or determine the equation from the graph of most of the following types of functions: $1/x$, $1/x^2$, quadratic, polynomial (not quadratic), rational, absolute value, square root, exponential, logarithmic
  - of the above, most should include transformations (shifts, reflections, and/or stretch/shrink)
- Combining and Composing Functions - include at least one of the following
  - evaluate combined or composed functions at a given value
  - find the equation for a combined or composed function
- Inverse Functions - find the equation of an inverse function
- Quadratic Functions
  - identify max/min value of the function
  - modeling with quadratics - for example, finding the function that models the area of a horse corral given the perimeter
- Polynomial Functions -include at least one of the following
  - use long division to divide two polynomials
  - find the rational zeros of a polynomial
- Exponential and Logarithmic Functions
  - solve at least one question covering a transformed exponential function and one covering a transformed logarithmic function.
  - use the laws of logarithms to combine or expand a logarithmic expression
- Equations and Inequalities
  - solve at least two exponential equations algebraically
  - solve a logarithmic equation algebraically
  - solve at least three of the following types of equations: quadratic, polynomial, radical, rational, absolute value, polynomial, rational inequailities
  - modeling with exponential functions: for example, finding when a population reaches a certain value, or finding a population value by knowing and using the generic exponential growth model
- Systems of Equations/Inequalities - including at least one of the following
  - solve a system of nonlinear equations and/or graph the solution
  - graph a system of inequalities

  - write the system of inequalities from a graph of the system

- Conic Sections - include one of the following
  - graph one conic section from the equation
  - find the equation of one conic section given the graph

- Sequences - include at least one of the following
  - find the partial sum of an arithmetic sequence
  - find the finite sum or infinite sum of a geometric sequence
  - be able to write and/or interpret summation notation

Final exams will be evaluated by the Core Assessment Committee based on the described desired outcomes for the course. Six questions on the exam corresponding to six of the bulleted points above will be chosen for closer review. The overall content of the exam and students' ability to write proper mathematics will also be assessed.