UAF DMS Guidelines for

MATH 151X –College Algebra for Calculus

Across all sections of Math 151X offered by UAF campuses (delivered in person or online), all syllabi must minimally satisfy the following requirements.
Note: This course meets 1 hour per day 3 days a week and 1.5 hours for 1 day (or should be set up for equivalent "class" time).

1. General guidelines set by UAF; follow this link to the UAF syllabus requirements
2. GER Information (sample statement below):

This course is listed as a General Education Math Course as such this course is expected to meet the general learning outcomes 1 and 2.

1. Build knowledge of human institutions, sociocultural processes, and the physical and natural works through the study of mathematics. Competence will be demonstrated for the foundational information in each subject area, its context and significance, and the methods used in advancing each.
2. Develop intellectual and practical skills across the curriculum, including inquiry and analysis, critical and creative thinking, problem solving, written and oral communication, information literacy, technological competence, and collaborative learning. Proficiency will be demonstrated across the curriculum through critical analysis of proffered information, well-reasoned solutions to problems or inferences drawn from evidence, effective written and oral communication, and satisfactory outcomes of group projects.

3. Text: Precalculus by Sisson
   • Chapter 1: 1.1-1.9 (r), 1.5 (o)
   • Chapter 2: 2.1-2.6 (r)
   • Chapter 3: 3.1-3.6 (r), 3.5 (o)
   • Chapter 4: 4.1-4.4 (r)
   • Chapter 5: 5.1-5.5 (r)
   • Chapter 6: 6.1-6.5 (r)
   • Chapter 10: 10.1-10.3 (r)
   • Chapter 11: 11.1, 11.7-11.8 (r)
   • Chapter 12: 12.1 (r)

4. Timing of material
For each of the following, the minimum time spent on the sections is listed.
This is a suggested outline with and comprehensive Final Exam.
Section Topic Approx. timing

Section Topic	Approx. timing
1.1 Real Numbers and Algebraic Expressions	½ -1 day
1.2 Properties of Exponents and Radicals	½ -1 day
1.3 Polynomials and Factoring	1 day
1.4 Rational Expressions	½ -1 day
1.6 Linear Equations in One Variable	1 day
1.7 Linear Inequalities in One Variable	1 day
1.8 Polynomial and Polynomial-Like Equations	1 day
1.9 Rational and Radical Equations	1 day
2.1 Cartesian Coordinate System	1 day
2.2 Circles	1 day
2.3 Linear Equations in Two Variables	1 day
2.4 Slope and Forms of Linear Equations	1 day

2.5 Parallel and Perpendicular Lines	1 day
2.6 Linear Inequalities in Two Variables	1 day

Exam over Chapters 1 and 2

3.1 Relations and Functions	1 day
3.2 Linear Functions	1 day
3.3 Quadratic Functions	1 day
3.4 Other Common Functions	1-1½ days
3.6 Mathematical Models	1 day
4.1 Transformations of Functions	1 day
4.2 Properties of Functions	1 day
4.3 Combining Functions	1 day
4.4 Inverse Functions	1 day

Exam over Chapters 3 and 4

5.1 Polynomial Functions and Inequalities	1-1½ days
5.2 Polynomial Division and Division Algorithm	1 day
5.3 Locating Real Zeros of Polynomial Functions	1 day
5.4 The fundamental Theorem of Algebra	1 day
5.5 Rational Functions and Inequalities	1-1½ days
6.1 Exponential Functions and Their Graphs	1 day
6.2 Exponential Models	1 day
6.3 Logarithmic Functions and Their Graphs	1 day
6.4 Logarithmic Properties and Models	1 day
6.5 Exponential and Logarithmic Equations	1-1½ days

Exam over Chapters 5 and 6

10.1 Ellipses	1 day
10.2 Parabolas	1 day
10.3 Hyperbolas	1 day
11.1 Solving Systems w/ Substitution and Elimination	1-1½ days
11.7 Systems of Linear Inequalities	1-1½ days
11.8 Systems of Non-linear Inequalities	1-1½ days
12.1 Sequences and Series	1 day

Exam over Chapters 10, 11, and 12

Review Chapters 1-6
Final over Chapters 1-6

5. Types of Assessments
- Midterm Exams
  - at least three exams during the semester
  - exams must be proctored, timed, closed book, closed notes
  - use of non-graphing calculators are allowed in this course but not for chapters 1-4
  - 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
  – for online work through HAWKES, mastery level should be no less than 75%
  – instructors should provide written feedback to students approximately weekly throughout the semester; this can be through humanly-graded assignments or email correspondence

6. 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.
  • Withdrawal and Incomplete policies must be stated explicitly.
  • The final grade in this course must adhere to the following:
      Written Assessed Work at least 15% and at most 25%
      HAWKES (individualized mastery work) at least 10% and at most 20%
      Exams at least 40%
      Comprehensive Final Exam At least 15%

7. Tutoring Services
  DMS Math and Stat Lab: If you need extra math 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 schedules are posted that provide tutor times.

  DMS One-on-one Tutoring: Free tutoring by appointment. This service is available to any UAF student registered in a core MATH course. Tutoring is available in CHAP 210. Appointments can be made for 30 minutes or an hour and can be scheduled up to two weeks in advance. Students can sign up for an appointment at https://fairbanks.go-redrock.com

  DMS Online Tutoring: Free tutoring available Monday - Saturday! This service is available to any UAF student registered in a MATH or STAT course. Tutoring is accessible through Zoom. Appointments can be made for 30 minutes or an hour and can be scheduled up to two weeks in advance. To schedule an appointment students can sign up for an appointment at https://fairbanks.go-redrock.com

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
      – 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