

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 4 general learning outcomes.

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. Acquire tools for effective civic engagement in local through global contexts, including ethical reasoning, intercultural competence, and knowledge of Alaska and Alaska issues. Facility will be demonstrated through analyses of issues including dimensions of ethics, human and cultural diversity, conflicts and interdependencies, globalization, and sustainability.
4. Integrate and apply learning, including synthesis and advanced accomplishment across general and specialized studies, adapting them to new settings, questions and responsibilities, and forming a foundation for lifelong learning. Preparation will be demonstrated through production of a creative or scholarly product that requires broad knowledge, appropriate technical proficiency, information collection, synthesis, interpretation, presentation and reflection.

3. Text: Precalculus by Sisson

- Chapter 1: 1.1-1.9 (r),
- 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, 12.2, 12.3 (r)

4. Online Homework System

This text comes with the HAWKES online homework which has a template for this course. This can be modified to adjust ordering of topics or due date and integrates with Canvas.

5. Timing of material

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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

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
12.2 Arithmetic Sequences	½ day
12.3 Geometric Sequences	½ day
Exam over Chapters 10, 11, and 12	
Review Chapters 1-6	
Final over Chapters 1-6	

6. Types of Assessments

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- Homework
 - 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
- Exams
 - at least two exams during the semester
 - exams must be timed, closed book, closed notes
 - exams should have some form of proctoring
 - 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

7. 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

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- 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

8. 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%

9. 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/STAT 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://uaf.traccloud.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://uaf.traccloud.com>

10. Other University Information that should be included

SSS (Student Support Services): SSS provides one-on-one tutoring to students who satisfy the requirements of the program. In addition to math tutoring, SSS provides advising, all core subject tutoring, laptop rentals, and some other services.

Office of Disability Services: This office implements the Americans with Disabilities Act (ADA), and insures that UAF students have equal access to the campus and course materials. I will work with the Office of Disabilities Services (203 WHIT, 474-7043) to provide reasonable accommodation to students with disabilities. Please provide the current accommodation paperwork to me as soon as you receive it. Without the letter, no accommodations will be made.

Equity and Inclusion Statement: UAF embraces and grows a culture of respect, diversity, inclusion, and caring. Students at this university are protected against sexual harassment and discrimination (Title IX). Faculty members are designated as responsible employees which means they are required to report sexual misconduct. Graduate teaching assistants do not share the same reporting obligations. For more

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information on your rights as a student and the resources available to you to resolve problems, please visit Students Rights and Responsibilities (Links to an external site.).

Coronavirus information: Visit the UA coronavirus information website (Links to an external site.) to learn how the University of Alaska is responding to the novel coronavirus/COVID-19 situation and find links to communications, policy guidance, and resources.

Emergency Notification Plan: Students will receive emergency notifications via phone email. Please check your UAOnline account to confirm your emergency notification settings. For more information, please refer to the Student Handbook. For course-specific notifications or one that your instructor plans to forward, you will receive these through Canvas notifications, so please update your profile in Canvas.

Extended absence policy: The University of Alaska Fairbanks recognizes that students may need to miss more classes than allowed by a particular instructor as specified in course policies. Extended absences are defined as missed classes or course work by students beyond what is permissible by the instructor's written course policies. Students may need to miss class and/or course work for a variety of reasons, including, but not limited to:

- Bereavement
- Personal illness or injury
- Serious illness of a friend, family member or loved one
- Military obligations
- Jury service
- Other emergency or obligatory situations

For more information, go to the Students Handbook or the Center for Students Rights and Responsibilities.

Nondiscrimination Statement: The University of Alaska is an affirmative action/equal opportunity employer and educational institution. The University of Alaska does not discriminate on the basis of race, religion, color, national origin, citizenship, age, sex, physical or mental disability, status as a protected veteran, marital status, changes in marital status, pregnancy, childbirth or related medical conditions, parenthood, sexual orientation, gender identity, political affiliation or belief, genetic information, or other legally protected status. The University's commitment to nondiscrimination, including against sex discrimination, applies to students, employees, and applicants for admission and employment. Contact information, applicable laws, and complaint procedures are included on UA's statement of nondiscrimination available at www.alaska.edu/nondiscrimination. For more information, contact:

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