Course description: Mathematical models; solving equations; creating, interpreting, and graphing functions. Particular focus is given to polynomial, exponential, and logarithmic functions. Prerequisites: two years of high school algebra and one year of high school geometry and TSI complete/exempt status in mathematics.

Text and Materials: The required textbook for this course is *Modeling, Functions, and Graphs: Algebra for College Students* by Katherine Yoshiwara. The textbook is free and available online at [https://yoshiwarabooks.org/mfg/](https://yoshiwarabooks.org/mfg/).

You will need a scientific calculator for this class. Graphing calculators may be used, but are not required. Calculators that include a solver such as the TI-89 or TI-Nspire and calculators that have a QWERTY keyboard are not allowed. The calculator function of a cell phone or tablet will not be permitted during tests or quizzes.

Exam Calendar: Please note that the dates for our in-class exams below are subject to change. The final is university scheduled and cannot be taken at a different time without permission of the Dean of the College of Sciences and Mathematics. Be sure to arrange your end-of-the-semester travel plans accordingly.

<table>
<thead>
<tr>
<th>Exam</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Wednesday, February 13</td>
</tr>
<tr>
<td>2</td>
<td>Wednesday, March 6</td>
</tr>
<tr>
<td>3</td>
<td>Wednesday, April 17</td>
</tr>
<tr>
<td>Final</td>
<td>Wednesday, May 15, 10:30 am-12:30 pm in our regular classroom</td>
</tr>
</tbody>
</table>

Course Requirements:

- **Three in-class exams**—If a student must miss an exam due to an excused absence, special arrangements should be made in advance. Student ID with photo may be required for exams. **Cell phones and tablet calculators are not allowed out during exams, even if that is all you brought.** Students are responsible for bringing their own scientific calculator to exams. No music (even through headphones) is allowed during exams.

- **Homework**—You will have weekly take-home homework each non-exam week.

- **Quizzes**—You will have weekly in-class quizzes each Wednesday of a non-exam week.

- **A comprehensive final exam**—The final exam is Wednesday, May 15, 10:30 am-12:30 pm.

- **Other Homework**—You will have access to WEBWORK at webwork.sfasu.edu. This is for your practice only and not for a grade.

- **Class attendance and participation**—Students are expected to attend all class meetings, arriving on time. If you are absent, you are responsible for determining what you missed and for being prepared for class when you return.

- **Preparing for class**—Students should be prepared to invest several hours per day outside of class reading the text, practicing examples, and working homework exercises. **Material to be discussed in class should be read before coming to class.** Check your university email regularly, as I may send reminders, assignments, or announcements.

- There is no extra credit. Do well enough on the items below to earn the grade you seek.

<table>
<thead>
<tr>
<th>Grading Policy:</th>
<th>60% First Three Exams</th>
<th>Grading Scale:</th>
<th>90% - 100%: A</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10% Homework</td>
<td></td>
<td>80% - 90%: B</td>
</tr>
<tr>
<td></td>
<td>10% Quizzes</td>
<td></td>
<td>70% - 80%: C</td>
</tr>
<tr>
<td></td>
<td>20% Comprehensive Final Exam</td>
<td></td>
<td>60% - 70%: D</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Below 60%: F</td>
</tr>
</tbody>
</table>

See [http://www2.sfasu.edu/math/docs/syllabi/MTH138Syllabus.pdf](http://www2.sfasu.edu/math/docs/syllabi/MTH138Syllabus.pdf) for elements common to all sections.
Core Objectives (CO):
1. **Critical Thinking [CO 1]**: to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information
2. **Communication Skills [CO 2]**: to include effective development, interpretation and expression of ideas through written, oral and visual communication
3. **Empirical and Quantitative Skills [CO 3]**: to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions

Student Learning Outcomes (SLO):
At the end of MTH 138, a student who has studied and learned the material should be able to:
1. Employ independence of thought and innovation in order to obtain solutions to typical algebraic problems. [CO 1]
2. Create, manipulate, analyze and solve algebraic equations and expressions, especially linear, quadratic, polynomial, rational, exponential and logarithmic expressions. [CO 1,3]
3. Connect graphical properties with those of associated functions or equations, and use these connections to communicate graphical or physical properties in algebraic language. [CO 2,3]
4. Read, interpret, and communicate written mathematics, both in prose and in its graphical or visual forms. [CO 2]
5. Use functions to model and solve real-world problems. [CO 1,3]

This is a general education core curriculum course and no specific program learning outcomes for the major in mathematics are addressed in this course.

**SFASU Policy 5.4:** The federal definition of a credit hour is an amount of work represented in intended learning outcomes and verified by evidence of student achievement that is an institutionally established equivalency that reasonably approximates:
1. Not less than one hour of classroom or direct faculty instruction and a minimum of two hours out-of-class student work each week for approximately fifteen weeks for one semester or trimester hour of credit, or 10 to 12 weeks for one quarter hour of credit, or the equivalent amount of work over a different amount of time, or;
2. At least an equivalent amount of work as outlined in item 1 above for other academic activities as established by the institution including laboratory work, internships, practica, studio work, and other academic work leading to the award of credit hours.

To this end, all students in courses offered by the Department of Mathematics and Statistics that wish to be successful should plan to spend at least two hours outside of class for every credit hour associated with this course. Expected activities to be completed in the time outside of class include reviewing notes from previous class meetings, reading assigned course resources, completing all assigned exercises and projects, and performing periodic assessment preparation.
Course description: Topics include mathematical models; solving equations; creating, interpreting and graphing functions. Particular focus is given to polynomial, exponential and logarithmic functions.

Core Objectives (CO):

1. **Critical Thinking** [CO 1]: to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information
2. **Communication Skills** [CO 2]: to include effective development, interpretation and expression of ideas through written, oral and visual communication
3. **Empirical and Quantitative Skills** [CO 3]: to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions

Credit hours: 3

The following is an excerpt from SFA Policy 5.4:

*The federal definition of a credit hour is an amount of work represented in intended learning outcomes and verified by evidence of student achievement that is an institutionally established equivalency that reasonably approximates:*

1. *Not less than one hour of classroom or direct faculty instruction and a minimum of two hours out-of-class student work each week for approximately fifteen weeks for one semester or trimester hour of credit, or 10 to 12 weeks for one quarter hour of credit, or the equivalent amount of work over a different amount of time, or;*

2. *At least an equivalent amount of work as outlined in item 1 above for other academic activities as established by the institution including laboratory work, internships, practica, studio work, and other academic work leading to the award of credit hours.*

To this end, all students in courses offered by the Department of Mathematics and Statistics that wish to be successful should plan to spend a minimum of two hours outside of class for every credit hour associated with this course. Expected activities to be completed in the time outside of class include reviewing notes from previous class meetings, reading assigned course resources, completing all assigned exercises and projects, and performing periodic assessment preparation.

Course Prerequisites and Corequisites: See general course prerequisites.

**General Education Core Curriculum:** This course has been selected to be part of SFA’s core curriculum. The Texas Higher Education Coordinating Board has identified six objectives for all core courses: Critical Thinking Skills, Communication Skills, Empirical and Quantitative Skills, Teamwork, Personal Responsibility, and Social Responsibility. SFA is committed to the improvement of its general education core curriculum by regular assessment of student performance on these six objectives. Assessment of these objectives at SFA will be based on student work from all core curriculum courses. This student work will be collected in D2L, the assessment management system selected by SFA to collect student work for core assessment.

The chart below indicates the core objectives identified by SFA to be assessed in this course. The instructor of each section of the course will provide the assignment(s) that will be used to assess the objectives as well as the date(s) by which the assignments must be completed and uploaded in D2L.

<table>
<thead>
<tr>
<th>Core Objective</th>
<th>Definition</th>
<th>Course Assignment Title</th>
<th>Date Due in D2L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Empirical and Quantitative Skills</td>
<td>To include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions.</td>
<td>The instructor of each section will determine the assignment for this assessment.</td>
<td>Only assessed in spring of odd years. (See instructor for due date(s).)</td>
</tr>
</tbody>
</table>
Math 138 – College Algebra
Syllabus Continuation

Course outline:

- Making Mathematical Models [CO 1, 2, 3]  
  Approximate time spent 5%
- Linear Equations, Functions and Models [CO 1, 2, 3]  
  o Review of Coordinate Geometry  
  o Graphs of Equations  
  o Lines and Linear Modeling  
  o Systems of Equations  
  Approximate time spent 20%
- Quadratic Equations, Functions and Models [CO 1, 2, 3]  
  o Graphs of Quadratic Equations  
  o Techniques for Solving and Optimizing Quadratic Equations  
  o Applications of Quadratic Functions  
  Approximate time spent 20%
- Functions [CO 1, 2, 3]  
  o Graphs of Functions  
  o Algebra of Functions  
  o Inverses of Functions  
  o Special Functions  
  o Polynomial Functions  
  o Division of Polynomials and Factorization  
  o Rational Functions  
  Approximate time spent 20%
- Exponential and Logarithmic Functions and Models [CO 1, 2, 3]  
  o Exponential Functions  
  o Logarithmic Functions  
  o Logarithmic Identities and Equations  
  o Exponential Equations and Applications  
  o Modeling with Exponential and Logarithmic Functions  
  Approximate time spent 20%
- Solving Equations [CO 1, 2, 3]  
  o Field Properties: Associativity, Commutativity, Identity, Inverses, Distributivity  
  o Review Rules for Exponents  
  o Incorporating Exponents and Logarithms in the Order of Operations  
  Approximate time spent 10%
- Explicit instruction in Critical Thinking, Communication and Empirical and Quantitative Reasoning is in addition to implicit instruction, modeling and practice that occur daily in the discussion of college algebra. This explicit instruction includes explanation of solving mathematical problems by thinking critically, communicating logically ordered solutions with complete and correct notation, and applying empirical or quantitative skills as appropriate to the problem.  
  Approximate time spent 5%

Academic Integrity

Academic integrity is a responsibility of all university faculty and students. Faculty members promote academic integrity in multiple ways including instruction on the components of academic honesty, as well as abiding by university policy on penalties for cheating and plagiarism.

The penalty for a student found cheating on any part of an assignment, quiz, or exam in this class will range from a grade of zero on the work to a grade of F in the course, and may result in additional, more severe disciplinary measures. A student who allows another to copy his work and the student copying the work are both guilty of cheating. Do your own work. Do not show your completed work to others. Do not allow others to copy your work.

Definition of Academic Dishonesty (SFA policy 4.1):
Academic dishonesty includes both cheating and plagiarism. Cheating includes, but is not limited to:

- using or attempting to use unauthorized materials on any class assignment or exam;
- falsifying or inventing of any information, including citations, on an assignment;
- helping or attempting to help other student(s) in an act of cheating or plagiarism.
Plagiarism is presenting the words or ideas of another person as if they were one’s own. Examples of plagiarism include, but are not limited to:

- submitting an assignment as one's own work when it is at least partly the work of another person;
- submitting a work that has been purchased or otherwise obtained from the Internet or another source;
- incorporating the words or ideas of an author into one's paper or presentation without giving the author credit.

Withheld Grades Semester Grades (SFA Policy 5.5)
Ordinarily, at the discretion of the instructor of record and with the approval of the academic chair/director, a grade of WH will be assigned only if the student cannot complete the course work because of unavoidable circumstances. Students must complete the work within one calendar year from the end of the semester in which they receive a WH, or the grade automatically becomes an F. If students register for the same course in future terms the WH will automatically become an F and will be counted as a repeated course for the purpose of computing the grade point average. The circumstances precipitating the request must have occurred after the last day in which a student could withdraw from a course. Students requesting a WH must be passing the course with a minimum projected grade of C.

Students with Disabilities
To obtain disability related accommodations, alternate formats and/or auxiliary aids, students with disabilities must contact the Office of Disability Services (ODS), Human Services Building, and Room 325, 468-3004 / 468-1004 (TDD) as early as possible in the semester. Once verified, ODS will notify the course instructor and outline the accommodation and/or auxiliary aids to be provided. Failure to request services in a timely manner may delay your accommodations. For additional information, go to http://www.sfasu.edu/disabilityservices.

Acceptable Student Behavior
Classroom behavior should not interfere with the instructor’s ability to conduct the class or the ability of other students to learn from the instructional program (see the Student Conduct Code, policy 10.4). Unacceptable or disruptive behavior will not be tolerated. Students who disrupt the learning environment may be asked to leave class and may be subject to judicial, academic or other penalties. This prohibition applies to all instructional forums, including electronic, classroom, labs, discussion groups, field trips, etc. The instructor shall have full discretion over what behavior is appropriate/inappropriate in the classroom. Students who do not attend class regularly or who perform poorly on class projects/exams may be referred to the Early Alert Program. This program provides students with recommendations for resources or other assistance that is available to help SFA students succeed.

Student Learning Outcomes (SLO): At the end of MTH 138, a student who has studied and learned the material should be able to:

1. Employ independence of thought and innovation in order to obtain solutions to typical algebraic problems. [CO 1]
2. Create, manipulate, analyze and solve algebraic equations and expressions, especially linear, quadratic, polynomial, rational, exponential and logarithmic expressions. [CO 1,3]
3. Connect graphical properties with those of associated functions or equations, and use these connections to communicate graphical or physical properties in algebraic language. [CO 2,3]
4. Read, interpret, and communicate written mathematics, both in prose and in its graphical or visual forms. [CO 2]
5. Use functions to model and solve real-world problems. [CO 1,3]

There are no specific program learning outcomes for this major addressed in this course. It is a general education core curriculum course and/or a service course.

Date of document: 01/11/2019