Math 140 (Math 2412) – Precalculus Mathematics
Course Syllabus

Course description: Preparatory for the calculus sequence: properties and graphs of algebraic, exponential, logarithmic, and trigonometric (with inverses); fundamental trigonometric identities; conic sections; polar and rectangular coordinate systems.

Credit hours: 4

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.

Course outline:
- Functions
  - Definition/notation
  - Domains/ranges of basic functions, their graphs, and topics appropriate to each type of function:
    - Linear functions: constant functions; slope; point-slope/slope-intercept form; solving linear equations/inequalities
    - Power functions: end behavior
    - Polynomials: intercepts, maximum/minimum number of turning points, and end behavior; solving polynomial equations/inequalities (factoring, Zero Product Principle, quadratic formula)
    - Rational functions: horizontal, vertical, and oblique asymptotes; polynomial long division and proper rational functions, end behavior
    - Exponential functions: properties of exponents (including, especially, rational exponents); asymptotes and end behavior; exponential growth/decay; natural exponential
    - Logarithmic functions: properties of logarithms; asymptotes and end behavior; natural logarithms; solving exponential/logarithmic equations
    - Piecewise-defined: common piece-wise defined functions (absolute value, stamp-price, etc.); graphing/interpreting piecewise-defined functions; 'skip' and 'jump' discontinuities
  - Transformations of the basic graphs: translations, reflections, and compressions/expansions
  - Combining functions: algebraically and by composition
  - Inverses of functions (including those that require branches, like the principal square root)
  - Approximate time spent: 30%
- Trigonometry
  - Triangular/circular functions
    - Definitions in both contexts
    - Special triangles and values of the trigonometric functions at the standard multiples
    - Graphs, domains/ranges, asymptotes, and transformations of the circular functions
  - Approximate time spent: 40%
Basic: reciprocal, quotient and Pythagorean identities
Others: sum/difference identities, double- and half-angle identities
  - Inverse trigonometric functions
  - Domains/ranges, reference angles
  - Graphs
  - Solving trigonometric equations
  - Law of Sines and Cosines

Analytic Geometry 30%
  - Cartesian coordinate system/distance formula
  - Conic sections: parabola, ellipse, hyperbola
  - Transformations (including rotations)
  - Polar coordinates
  - Systems of equations

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 140, a student who has studied and learned the material should be able to:

1. Define “function”.
2. Recognize basic functions (including transcendental functions) algebraically and graphically.
3. Identify determining factors of the graph of a function either algebraically or from the graph, including the domain and range, intercepts, asymptotes, and end behavior.
4. Generate composite functions and identify domains/ranges.
5. Define and recognize when a function is one-to-one and explain why this is necessary for a function to have an inverse.
6. Compute the inverse of a function and understand that the domain may need to be restricted in order to do so.
7. Define triangular/circular trigonometric functions.
8. Determine the domains/ranges/graphs of circular trigonometric functions and their transformations.
9. Identify special triangles and values of the trigonometric functions at the standard multiples.
10. Extend the definition of the trigonometric functions and the Pythagorean Theorem to obtain the reciprocal, quotient, and Pythagorean identities.
11. Understand the sum and difference formulas and use them to generate the double- and half-angle formulas.
12. Restrict the domain of the trigonometric functions so that the inverse trigonometric functions may be defined.
13. Solve trigonometric equations.
15. Recognize that the distance formula is an application of the Pythagorean Theorem.
16. Define and analyze the conics: circles, ellipses, parabolas, and hyperbolas.
17. Convert the polar equation of a conic to a rectangular equation and vise versa.
18. Solve basic systems of equations.

*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.*