Sample Descriptor - Math 70X

The intent of this template is to provide base-line preparatory/concurrent support courses that colleges may tailor to meet the needs of their student populations, and is not intended for course submission to C-ID.

Discipline: Mathematics – Pre-Transfer

Proposed Sub-discipline (if applicable):

General Course Title: Foundations of Algebra for Mathematics-Intensive Fields

Min. Units: 3

General Course Description:

This course consists of elements of beginning and intermediate algebra necessary for long-term engagement in math-intensive fields. Topics include: polynomial, rational, radical, exponential, and logarithmic—expressions, equations, functions, graphs, modeling and applications; polynomial, rational, and radical inequalities; systems of equations; algebra of functions; and complex numbers. This course may be accompanied by corequisite/concurrent or prerequisite/preparatory support based on local placement practices and course offerings, for students needing more foundational skills.

This course may be offered in lecture or lab format as locally determined. Units are listed as minimum units commensurate with the depth and breadth at which topics are covered as determined locally. Additional topics may be added with unit load increased appropriately. This course may be mirrored as a noncredit course based on local need and policy.

Proposed Number: 70

Proposed Suffix (if applicable): X

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NOTE: Descriptor templates with an X suffix fall outside of SB 1440/440 and are not subject to mandates associated with such legislation.

Any rationale or comment

This course description includes baseline exit skills of an intermediate algebra course for students pursuing majors in mathematics-intensive fields. In addition, prerequisite and/or foundational skills are implicit in many topics and may not be explicitly stated in the Course Content. For example, “operations of real numbers” is a prerequisite to topics in this course. It is expected that colleges may include additional topics or elements as appropriate to local curricular programs. As additional topics are included, the number of units should increase accordingly. Some colleges may choose to offer this course as a corequisite/concurrent course for students choosing to be enrolled in a transfer-level course that may need additional instruction and support, or as a prerequisite/preparatory course for students choosing not to enroll in a transfer-level course concurrently. This course is not a required element of a college’s curricular offerings, rather an option for colleges to meet the needs of the local student population. The particular curriculum implementation is at the discretion of the expertise of the local discipline faculty.

Students who complete this course will have completed the equivalent of Intermediate Algebra needed for mathematics intensive fields.

Required Prerequisites: Local Decision

Required Co- Requisites: Local Decision

Advisories/Recommended Preparation1:

It is expected that students have completed the skills attained in high school algebra I or the equivalent through the Common Core State Standards in Mathematics (CCSSM). Options for students who have not attained these skills may include:

1. Corequisite/concurrent model of C-ID Math 50X Elementary Mathematics
2. Prerequisite/preparatory model of C-ID Math 50X Elementary Mathematics

Course Content:

The following topics should be covered with a focus on skills development for trigonometry, college algebra, pre-calculus, calculus mathematics and an emphasis on modeling and applications:

1. Algebraic Expressions – simplify and evaluate
2. Rational Exponents
3. Polynomials – Monomial, Binomial, Trinomial
   a. Rigorous study of factoring including Substitution
   b. Solve Equations by factoring
   c. Quadratic Formula
   d. Graphing
4. Rational Expressions and Equations
   a. Solve Equations
   b. Introduction to Graphing
5. Inequalities – Linear, Absolute Value, Quadratic, Rational
   a. Solve
   b. Graphing
   c. Introduction to non-linear inequalities
6. Radical Expressions and Equations – Square Root, Cube Root, nth root
   a. Rational Exponents
   b. Introduction to Complex Numbers
7. Exponential and Logarithmic Equations
   a. Conversion between basic logarithmic and exponential equations
   b. Properties of logarithms
   c. Solving exponential and logarithmic equations
8. Functions – Polynomial, Rational, Radical, Exponential, Logarithmic
   a. Function Notation
   b. Algebra of functions and composition of functions
   c. Domain and Range
   d. Graphing
   e. Inverse Functions
9. Conic Sections – Parabolas and Circles
10. Systems of Linear Equations

[1] Advisories or recommended preparation will not require validation but are recommendations to be considered by the student prior to enrolling.

Optional Topics:

1. Sequences and Series—Summation Notation
2. Matrices
3. Conic Sections—ellipses, hyperbolas
4. Binomial Theorem
5. Systems of Nonlinear Equations
6. Other topics
7. Affective Domain experiences (to develop being Self-Motivated, Persistent, Skeptical, Focused, Organized, Meta-cognitive, Prepared, Risk-taker, and Adaptable)

Laboratory Activities: (if applicable)

The course content could be offered in a laboratory format at the discretion of discipline faculty.

Course Objectives: At the conclusion of this course, the student should be able to (appropriate to the level and content of this course):

1. Solve polynomial, rational, absolute value, radical, exponential, logarithmic equations;
2. Solve systems of linear equations;
3. Factor polynomials;
4. Solve linear and absolute value inequalities;
5. Graph linear and nonlinear functions, parabolas, and circles;
6. Apply basic operations on functions;
7. Find inverse functions; and
8. Use mathematical modeling to solve problems relating to topics such as exponential growth and decay, mixing, or optimization.

Methods of Evaluation:

To be determined by local department faculty. The instruments of evaluation require students to demonstrate their mastery of the learning objectives and their ability to devise, organize, and present complete solutions to problems. Departments may wish to consider using departmental final exams and focus on transparency of exam topics and grading rubrics.

Sample Textbooks, Manuals, or Other Support Materials (do not include editions or publications dates)

Instructional materials are a local decision at the discretion of the discipline faculty.

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