# Kent Core Course Proposal Questionnaire

Please review the Kent Core Policy Statement before completing and submitting the questionnaire to the University Requirements Curriculum Committee accompanied by a Course Catalog Update workflow and typical course syllabus.

**Date:** 11/5/2014

**Department/School:** Mathematical Sciences

**Course ID:** 10774 **Credit Hours:** 3

**Course Title:** Algebra for Calculus Stretch II

**Prerequisite(s):** C or better in Math 10773 Algebra for Calculus Stretch I

**Select Kent Core Category:**

- ☐ **Composition**
- ☒ **Mathematics and Critical Reasoning**
- ☐ **Humanities and Fine Arts**
  - ☐ **Humanities**
  - ☐ **Fine Arts**
- ☐ **Social Sciences**
- ☐ **Basic Sciences**
- ☐ **Additional**

1. **Explain how the course addresses (a) concepts central to the subject area and (b) the specific Kent Core learning goals listed in the *University Catalog* (www.kent.edu/catalog/kent-core)**

   a. **Acquire critical thinking and problem-solving skills.**

   One primary objective of this course is problem solving.

   b. **Apply principles of effective written and oral communications.**

   Students will present written reports of their work.

   c. **Broaden their imagination and develop their creativity.**

   This course will expand the way students perceive the importance and utility of quantitative reasoning in situations that are of relevance to their future careers.

   d. **Cultivate their natural curiosity and begin a lifelong pursuit of knowledge.**

   Success and positive experiences in this course will help break down the notion that mathematical sciences are not accessible or useful to the average person in everyday situations. This will lead students to expand the domains where they feel confident to pursue their natural curiosity and develop their knowledge.

   e. **Develop competencies and values vital to responsible uses of information and technology.**

   Familiarity with number facts is critical for understanding information in the modern world.

   f. **Engage in independent thinking, develop their own voice and vision and become**

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**informed, responsible citizens.**

Understanding number facts is often necessary to independently and critically evaluate information that is given a person.

g. **Improve their understanding of issues and behaviors concerning inclusion, community and tolerance.**

Not routinely covered in this course.

h. **Increase their awareness of ethical implications of their own and others' actions.**

Not routinely covered in this course.

i. **Integrate their major studies into the broader context of a liberal education.**

The use of algebra to model various situations arises in a number of contexts.

j. **Strengthen quantitative reasoning skills.**

This is a primary goal of the course.

k. **Understand basic concepts of the academic disciplines.**

The use of algebra to model various situations arises in a number of contexts.

2. **If this course is being proposed for the Composition category or the Mathematics and Critical Reasoning category, indicate the essential skills that the course is intended to teach, sharpen or strengthen. (Skip this question if the proposed course is intended for other categories.)**

This course along with Math 10773 will prepare students who are planning to take calculus with the algebra background needed to be successful in calculus.

3. **State how the course is representative of a field that has attained maturity and substance with critical mass of its own scholarly literature, methodology, community of specialists and conceptual framework.**

Algebra has its roots in antiquity. Algebra as a separate discipline emerged in the 16th century, and has been an object of research and study continuously since then.

4. **Are adequate resources available for this course (e.g., faculty, classroom space, equipment, library holdings)? If yes, explain.**

Yes. Enrollments for Math 00023, Math 00024 and Math 11010 will decline as enrollments for this course increases.

5. **Has this course been offered previously?**

Currently being offered as Math 20095

6. **Given the available Kent Core course options, why is it important that this course be added as an option for students in fulfilling their Kent Core?**

Students taking this course (along with Math 10773) will have the same outcomes as Math 11010 Algebra for Calculus and that course fulfills the Kent Core. This course (along with Math 10773) is open to students who are not prepared for Math 11010 or Math

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10775 and provides the background and extra time such students need to be successful with this material. Students are not allowed to get credit for this course and for either Math 11010 or Math 10775.

7. **Please complete and attach the Kent Core Learning Outcomes Assessment Plan, and attach a sample syllabus.**

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# Kent Core Learning Outcomes Assessment Plan

Course number, title (credit hours): 10774, Algebra for Calculus Stretch II (3 credit hours)

Department/School: Department of Mathematical Sciences  Proposed Kent Core Category: Mathematics and critical reasoning

*A sample syllabus must accompany the plan.*

| I. Kent Core learning objectives | II. Ohio Transfer Module learning objectives | III. What corresponding learning outcomes are included in this course? | IV. What method(s) will be used to assess student learning? | V. What evidence of this assessment will be presented annually for the five-year Kent Core review of this course? |
|---|---|---|---|---|
| Students will represent functions verbally, numerically, graphically and algebraically. Functions will include linear, quadratic, polynomial, rational, root/radical/power, piecewise-defined, exponential, and logarithmic. | Students will develop mathematical thinking and communication skills. They complete assignments that will develop analytical and critical reasoning, problem-solving, and mathematical habits of mind. | Students will learn to use a function model to analyze and interpret a situation described verbally or with data. | Students will solve problems and discuss theorems in class. | Each year, data from all sections will be collected and analyzed. We will report the total number of students assessed, and the achievement levels on homework assignments, and on midterm and final exams. |
| Students will perform operations on functions and transformations on the graphs of functions. | Students will learn to state problems carefully, modify problems when necessary to make them tractable, to articulate assumptions, to appreciate the value of precise definitions, to reason logically to conclusions, and to interpret results intelligently. | Students will learn to compare and contrast characteristics (numeric, graphical, symbolic) of functions studied in the course: linear, quadratic, exponential, logarithmic, and polynomial. | Students will complete homework assignments. They will take and pass midterm and final exams. | |

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| I. Kent Core learning objectives | II. Ohio Transfer Module learning objectives | III. What corresponding learning outcomes are included in this course? | IV. What method(s) will be used to assess student learning? | V. What evidence of this assessment will be presented annually for the five-year Kent Core review of this course? |
|---|---|---|---|---|
| Students will analyze the algebraic structure a function and then graph the function. For the functions listed above, students will determine intercepts, domain, range, intervals on which the function is increasing, decreasing or constant, the vertex of a quadratic function, asymptotes, whether the function is one-to-one, whether the graph has symmetry (even/odd), etc. Given the graph of a function, students will determine possible algebraic definitions. | Students will be taught to approach problem solving with a willingness to try multiple approaches, to persist in the face of difficulties, to assess the correctness of solutions, to explore examples, to pose questions, and to devise and test conjectures. | Students will learn how to find inverses of the functions listed above. They learn the relationship of the graph of a function to that of its inverse. They will solve a variety of equations and inequalities: including polynomial, rational, exponential, and logarithmic. They will also study functions arising in application problems. | All activities in the course will contribute to basic proficiency in the use of polynomial, rational, exponential, and logarithmic functions. | |
| Students will solve a variety of equations and inequalities; including polynomial, rational, exponential, and logarithmic. This will include those functions arising in application problems. | Students will learn to read mathematics with understanding and to communicate mathematical ideas with clarity and coherence through writing and speaking. | Students will learn to identify and express the conics (quadratic equations in two variables) in standard rectangular form. They will learn to graph the conics and solve applied problems involving the conics. | | |

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ASSURANCES:

By submitting this proposal, we assure that:

1. The faculty members who teach this course have agreed to the learning outcomes and assessment methods.
2. Assessment results will be reviewed annually by the faculty and submitted to the University Requirements Curriculum Committee.
3. Modifications to the course and/or assessment plan will be based on the annual review.

Department Chair/School Director (or designee) Signature Andrew Nelson Date 11-20-14

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**Syllabus**

Math 10774-Algebra for Calculus Stretch II

Second Semester 45 days

Functions in General - 6 days

. Composition of functions
. Graphing techniques - quadratic, root, power, rational
o Symmetry
o Eve/odd functions
o Horizontal and vertical translations
o Vertical and horizontal stretches and compressions - non rigid transformations

Rational Expressions and Functions - 11 days

. Finding domains
. Simplifying
. Multiplying and Dividing
. Adding and Subtracting
. Rational Equations & applications
. Graphing rational functions
. Rational inequalities

Exponential and Logarithmic Functions - 15 days

. One to one functions
. Inverse functions
. Exponential functions - graphing and applications
. Logarithmic functions - graphing and applications
. Properties of logarithms
. Logarithmic equations
. Exponential equations
. Exponential applications

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Conic Sections - 6 days

. Distance formula
. Circles
. Ellipse
. Parabola
. Hyperbola

4 EXAMS 3 REVIEW DAYS

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KENT STATE UNIVERSITY

Name: Katherine J Smith Submission Date: 1/19/2015

Organization: Curriculum Services

**Course Catalog Update**

<< Go back to Course Catalog Update form Print

## Basic Course Data

**Change type:** Establish

**Faculty member submitting this proposal:** Mark L. Lewis

**Requested Effective Term:** 201580

**Campus:** Kent

**College:** AS-Arts and Sciences

**Department:** MATH-Mathematical Sciences

**Course Subject:** MATH-Mathematics

**Course Number:** 10774

**Course Title:** Algebra for Calculus Stretch II

**Title Abbreviation:** Algebra for Calculus Stretch 2

**Slash Course and Cross-list Information:**

## Credit Hours

**Minimum Credit / Maximum Credit:** 3 to 3

**Contact Hours: Lecture - Minimum Hours / Maximum Hours:** 3 to 3

**Contact Hours: Lab - Minimum Hours / Maximum Hours:**

**Contact Hours: Other - Minimum Hours / Maximum Hours:**

## Attributes

**Is this course part of the LER, WIC or Diversity requirements:** Yes

**If yes, course attributes:** 1. LMCR-LER-Mathematics and Critical Reasoning 2. 3.

| | | |
|---|---|---|
| **Can this course be repeated for credit:** No Repeat | **Course Limit:** | **OR Maximum Hours:** |
| **Course Level:** Undergraduate | **Grade Rule:** B-Standard letter | |

**Rationale for an IP grade request for this course (if applicable):**

**Schedule Type(s):** 1. LEC-Lecture 2. 3.

**Credit by Exam:** N-Credit by exam-not approved

## Prerequisites & Descriptions

**Current Prerequisite / Corequisite / Catalog Description:**

**Catalog Description (edited):** Continuation of Math 10773. Rational expressions and functions, Exponential and Logarithmic functions, and Conic Sections. Cannot earn credit for this course if already has credit for Math 11011 or Math 12001. Cannot earn credit for this course and either Math 11010 or Math 10775. This course has the same outcomes as Math 11010. Completing this course fulfills any requirement of Math 11010.

**Prerequisites (edited):** C or better in Math 10773

**Corequisites (edited):**

**Registration is by special approval only:** No

## Content Information

**Content Outline:**

| Content Hours per Course Topic | Topic Description |
|---|---|
| 6 | Functions in General |
| 11 | Rational Expressions and Functions |
| 15 | Exponential and Logarithmic Functions |

| | |
|---|---|
| 6 | Conic Sections |
| 4 | Exams |
| 3 | Review |

Display/Hide Delimited Course Outline

**Total Contact Hours:** 45

**Textbook(s) used in this course:** A custom edition of Beecher, Penna, Bittinger (2012). College Algebra, 4th edition. Pearson

**Writing Expectations:** Students will be expected to write homework and exams.

**Instructor(s) expected to teach:** Kellerman, Ruchotzke

**Instructor(s) contributing to content:** Kellerman

## Proposal Summary

**Explain the purpose for this proposal:**

New state regulations do not allow students scoring 22 or higher on Math ACT to be placed in remedial courses. Our data shows that students scoring below 45 on ALEKS are highly likely to be unsuccessful in Math 11010. This course along with MATH 10773 provides the extra material needed for students to be successful.

**Explain how this proposal affects program requirements and students in your unit:**

NA

**Explain how this proposal affects courses, program requirements and student in other units:**

Students currently placed in Math 00023 that need Math 11010 will take MATH 10773 and this course in place of Math 00023, Math 00024, and Math 11010.

**Explain how this proposal affects enrollment and staffing:**

This will decrease enrollment in Math 00023 and Math 11010. We expect that the enrollment in Math 00024 will disappear entirely. Instructors currently teaching those courses will be diverted to teach this course. No net change on staffing.

**Units consulted (other departments, programs or campuses affected by the proposal):**

All Colleges

## Curriculum Services Information:

| | |
|---|---|
| **Approved by EPC:** | **Curriculum Bulletin:** |
| **Cross-list Banner Code:** | **OBR Course Level:** |
| **OBR Program Code:** | **OBR Subsidy Code:** |
| **CIP Code:** | **Term Start:** |
| | **Term End:** |

## Comments (500 Character Maximum):

NOTE: Please do not use the following restricted characters: (~ * / \ --)

Approve | Return To Previous Approver | Deny

**Comments:**

| Date | User | Comment |
|---|---|---|
| 11/21/2014 | Mark L. Lewis | No comments available. |

**History:**

| Date | User | Status |
|---|---|---|
| 12/15/2014 | Donald F. Palmer | Approved |
| 12/8/2014 | Mary Ann Haley | Approved |
| 11/21/2014 | Andrew M. Tonge | Approved |
| 11/21/2014 | Mark L. Lewis | Submitted |
| 11/20/2014 | Andrew M. Tonge | Returned For Edit |
| 11/13/2014 | Mark L. Lewis | Submitted |