

MATH080 - Intermediate Algebra

General Information

Author(s):	Scott Sakamoto
Proposal Start:	Spring 2020
Distance Education Approved:	Yes
TOP Code:	1701.00
TOP Code Name:	Mathematics, General
CIP Code:	27.0101
CIP Code Name:	Mathematics, General
SAM Code:	E = Non-Occupational
Course Control Number:	CCC000181722
Curriculum Committee Approval Date:	10/21/2019
Board of Trustees Approval Date:	01/13/2020
External Review Approval Date:	09/28/2010
Course Description:	A second course in algebra that includes systems of equations, inequalities, graphs and functions, radicals, quadratics, polynomials, rational expressions, exponential and logarithmic functions, conics, and problem solving. This course meets the prerequisites for Math 140 and 160.
Submission Rationale:	Mandatory Revision

Faculty Minimum Qualification Requirements

Master Discipline Preferred:	Mathematics
Alternate Master Discipline Preferred:	No value
Bachelors or Associates Discipline Preferred:	No value
Additional Bachelors or Associates	No value

Discipline:**Course Development Options****Course Basic Skill Status**

Course is not a basic skills course.

Grading Criteria

0

Grade Options

Letter Grade methods
 Other: Assignments: Homework 0-10% Quizzes 0-10% Exams/Tests 50-70% Final Exam 20-33%
 Grading Scale: A = 90-100% B = 80-89% C = 70-79% D = 60-69% F = 0-59%

 Allow Students to Gain Credit by Exam/Challenge
Rationale For Credit By Exam/Challenge

Students can meet prerequisites for transfer-level courses after completing this course.

Retake Policy Description

NR - Non-Repeatable

 Allow Students To Audit Course
Course Prior to College Level

One level below transfer.

Associated Programs**Associated Program****Award Type**

Liberal Arts: Mathematics and Sciences, AA

A.A. Degree Major

Liberal Arts: Mathematics and Sciences, AA

A.A. Degree Major

Transferability & Gen. Ed. Options**Request for Transferability**

Not transferable

Transferability Status

Not transferable

Local - Plan A**Categories****Transferability Status****Comparable Course or Shared SAC Course**

Area E2: Communication/Analytical Thinking	Communication/Analytical Thinking	Pending	No Comparable Course or Shared SAC Course defined
Area G1: Mathematics Proficiency	Area G1: Mathematics Proficiency	Pending	No Comparable Course or Shared SAC Course defined

Units and Hours

Summary

Minimum Units	5	Total Course In-Class (Contact) Hours	90	Total Student Learning Hours	270
Minimum Units	5	Total Course Out-of-Class Hours	180	Faculty Load	5

Detail

Weekly Student Hours

	In Class	Out of Class
Lecture Hours	5	10
Lab Hours	-	-
Activity Hours	-	-

Course Student Hours

Course Duration (Weeks)	18
Hours per unit divisor	54
Course In-Class (Contact) Hours	
Lecture	90
Lab	-
Activity	-
Total	90
Course Out-of-Class Hours	
Lecture	180
Lab	-
Activity	-
Total	180

Units and Hours - Weekly Specialty Hours

Requisites

Prerequisite

Recommendation from qualifying profile from the Mathematics placement process

Entrance Skills

Skill

Rational (Optional)

No value

No value

Limitations on Enrollment

Specifications

Methods of Instruction

Rationale (Optional)

Cooperative Learning

Discussion

Distance Education

Handouts

Instructor-Prepared Materials

Lecture

Mediated Learning

Observation and Demonstration

Problem Solving using Graphing Calculators

Outside-of-Class Assignments Only

- Reading assignments
- Homework problems

Methods of Evaluation

Final Exam

Exams/Tests

Quizzes

Worksheets

Homework

Rationale (Optional)

Instructors use their own final exam and include embedded questions provided by the Math 080 coordinator.

Textbook Rationale

No value

Textbooks

Author	Title	Publisher	Date	ISBN
Sullivan, M., Struve, K.R.	Intermediate Algebra	Pearson	2018 (\$140.75)	9780134555805

Learning Outcomes and Objectives**Course Objectives**

- ✓ Solve equations involving rational, absolute value, quadratic, radical, and literal equations; variation, and applications
- ✓ Evaluate functions using proper function notation
- ✓ Determine the domain and range of a function
- ✓ Determine whether a graph or equation is a function
- ✓ Perform operations on functions
- ✓ Solve systems of two and three linear equations in two and three variables, respectively, by substitution, elimination by addition, and graphing
- ✓ Solve systems of non-linear equations
- ✓ Solve systems of linear inequalities in two variables
- ✓ Construct systems for application problems and solve using the appropriate methods.
- ✓ Apply the laws of exponents
- ✓ Apply arithmetic operations on polynomials
- ✓ Divide polynomials by synthetic and long division

- ✓ Factor polynomial expressions by greatest common factor (GCF) and grouping
- ✓ Obtain the zeros of a polynomial
- ✓ Solve quadratic equations by factoring, completing the square, and substitution
- ✓ Evaluate quadratic and polynomial functions
- ✓ Graph a quadratic function by its properties, and transformations
- ✓ Solve quadratic equations with complex roots
- ✓ Solve application problems involving quadratic equations and functions
- ✓ Apply algebraic operations to simplify rational expressions
- ✓ Solve rational equations
- ✓ Construct rational equations for application problems and solve using the appropriate methods.
- ✓ Determine the domain of a rational function
- ✓ Graph a rational function
- ✓ Manipulate and simplify expressions containing radicals and exponents
- ✓ Apply arithmetic operations on radical expressions and expressions with rational exponents
- ✓ Rationalize denominators by using the conjugate
- ✓ Rewrite expressions with rational exponents in radical form and vice versa
- ✓ Determine the domain of a radical function
- ✓ Graph a radical function
- ✓ Solve applications involving radical equations and functions
- ✓ Compute and simplify composed functions
- ✓ Find the inverse function of a given one-to-one function
- ✓ Graph a one-to-one function and its inverse
- ✓ Determine the domain and range of a function and its inverse
- ✓ Simplify logarithmic and exponential expressions
- ✓ Solve logarithmic and exponential equations including equations with the natural and common logarithm, base e , and change-of-base formula
- ✓ Graph logarithmic and exponential functions
- ✓ Solve application problems involving logarithmic and exponential equations and functions
- ✓ Obtain the vertex and intercepts to graph a parabola
- ✓ Apply the distance formula to find the distance between two points
- ✓ Obtain the center and radius/radii to graph circles and ellipses
- ✓ Obtain the center, intercepts and asymptotes to graph a hyperbola
- ✓ Rewrite non-standard equations to the standard equations for a circle, parabola, ellipse and hyperbola

CSLOs

Identify different types of equations and solve them by applying the appropriate algebraic methods.

Expected SLO Performance: 70

Solve applications involving different types of functions and/or equations by applying the appropriate solving techniques.

Expected SLO Performance: 70

Graph equations, functions, and conics by applying different graphing techniques and transformations.

Expected SLO Performance: 70

Course Outline

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Equations (12 hours)

- Rational
- Absolute value
- Quadratic
- Radical
- Literal
- Variation
- Inverse
- Applications

Functions (6 hours)

- Definition of a function
- Function notation
- Domain and range
- Graphs of functions
- Operations on functions

Systems of Equations and Inequalities (6 hours)

- Systems of linear equations in two and three variables
- Graph systems in two variables
- Consistent, inconsistent and dependent systems
- Non-linear systems of equations
- Linear inequalities in two variables

Quadratics and Polynomials (16 hours)

- Laws of exponents
- Scientific notation
- Arithmetic operations on polynomials
- Synthetic division
- Factoring polynomials
- Zeros of a polynomial
- Complex numbers
- Graphs of quadratics
- Applications
- Quadratic and polynomial functions

Rational Equations and Functions (6 hours)

- Domain
- Simplify rational expressions
- Arithmetic operations
- Rational equations and functions
- Graphs of rational functions
- Applications

Radical Equations and Functions (6 hours)

- Domain
- Rational exponents
- Arithmetic operations on radical expressions
- Radical equations and functions
- Graphs of radical functions
- Applications

Compositions and Inverses (6 hours)

- Composite/Inverse function notation
- Domain and range of inverses
- Definition of an inverse function
- One-to-one functions
- Inverse of a function
- Graphs of inverse functions

Exponential and Logarithmic Functions (16 hours)

- Definition of
 - an exponential function
 - a logarithmic function
- Domain and range
- Natural and common logarithms, base e
- Properties of exponential and logarithmic functions
- Graphs of exponential and logarithmic functions
- Exponential and logarithmic equations
- Applications

Conic Sections (6 hours)

- Parabolas
 - Vertex
 - Intercepts
 - Graphs
- Distance formula
- Circle
 - Center
 - Radius
 - Equations
 - Graphs
 - Intercepts
- Ellipse
 - Center
 - Equations
 - Radii
 - Intercepts
 - Graphs
- Hyperbola
 - Center
 - Equations

- Intercepts
 - Asymptotes
 - Graphs
-

Distance Education Addendum

1. Is the method of delivery 100% online or hybrid? Please select one.

Hybrid

2. Title 5 (55204) states that “Any portion of a course conducted through distance education includes regular effective contact between instructor and students, through group or individual meetings, orientation and review sessions, supplemental seminar or study sessions, field trips, library workshops, telephone contact, correspondence, voice mail, e-mail, or other activities.” Describe/give examples of the methods of instruction which will be used in the hybrid/online course. Please include how the methods of instruction used in the traditional classroom will be modified and/or replaced in the hybrid/online classroom. How will these methods ensure that you will maintain regular effective contact with the students?

Students will use publisher-provided materials and learning management system (e.g. MyOpenMath) and/or tutorial materials.

Participation is tracked by students completing weekly assignments as well as being active in the learning management system, e.g., viewing lecture videos, attempting practice problems, homework, forums, etc.

Interaction is primarily conducted through weekly emails from the instructor. The instructor sends a weekly email listing tasks students should be working on to stay on schedule, due dates for assignments in the coming week and any other pertinent information for the week.

Students are assigned chapter/module assessments and each assessment is assigned a due date. Additionally, students are given at least a cumulative midterm exam given midway through the semester and a cumulative final exam given at the end of the semester.

The instructor emails students after each assessment with feedback and examples from the analytics so that students can see solutions to the questions on the assessments in which the class scored least.

Homework is assigned and anytime a student has any questions regarding homework, a student can send a message to the instructor directly from the learning management system with a link to the identical question the student received. The instructor can use the mathematics tool embedded in the learning management system to show a solution or give a hint to the solution.

Other one-to-one communication occurs through discussion boards and/or forums where students are required to participate. Students will post/reply to an intermediate algebra-related topic presented in the discussion board/forum by researching the topic and then posting an original solution. Students are graded on grammar, originality, replies to peers and the mathematically-correct solution. Other forums may include study-group meetings, students helping students with homework questions and overall discussion of the course and its content.

Furthermore, students send emails to the instructor with intent to clarify course content. In return, the instructor

then either schedules a phone appointment or office appointment to help the student one-on-one, provides feedback solely on the content question(s) via email, posts solutions online, or creates additional instructional videos as needed. Students are also encouraged to attend instructor (virtual) office hours as needed.

3. Describe how you will promote and monitor effective student-to-student contact.

Students are encouraged to form on-campus or online study groups, where groups of 2-4 students meet in-person throughout the semester. Students are encouraged to enroll in the Math Success Center, where they can work on online assignments together, while obtaining assistance from instructors and tutors as needed. Students are also required to complete mathematics-based forum questions in which students are required to read and/or comment on their peers' posts. For example, the first forum is an introduction, where students post their major and one study tactic to assist students in being successful in an online/hybrid course or a topic that is most challenging in Algebra.

4. Describe and give examples of how student learning will be evaluated.

Student learning is evaluated by online and written assessments. While homework and practice answers are submitted online, work is to be completed by hand and may be submitted to the instructor in person for evaluation. Students are also required to take online quizzes, in which their understanding of content is tested within a reasonable time limit. Written exams are taken on campus, where final answers and solutions processes are assessed.

5. List any special texts, equipment, or supplies needed for this course or sections of this course being offered through distance education.

Students are required to obtain a publisher access code or access to the learning management system. Once the code or access is obtained, the students have access to an online version of the physical textbook (e-book), as well as all other instructional materials (homework, quizzes, tutorials, explanations, lecture videos, etc.).

6. Describe the college resources that will be required by you and your students (facilities, technology, student support services) for this course.

The only required resources that students need is a computer with internet access, and a telephone. When needed, technical support is provided by telephone, free of charge, by the instructor or the publisher technical support service. There are no college resources required.

7. Section 55200 of title 5 states "In addition, instruction provided as distance education is subject to the requirements that may be imposed by the Americans with Disabilities Act (42 U.S.C. §12100 et seq.) and section 508 of the Rehabilitation Act of 1973, as amended, (29 U.S.C. §794d)." What technologies will you be using for instruction (video, flash, images, etc)? How will you ensure that instruction using these technologies is accessible to students with disabilities?

Alternative tags will be used for visual material and audio recordings will be available with closed captioning and written transcripts. Online lectures will be given in an audio/visual format as well as a read-only option to ensure accessibility. Closed captioning and written transcripts will be provided for videos. Documents (e.g., lectures, handouts, assignments, rubrics) will be provided in an accessible format as well (e.g., Word, Rich Text Format, use of proper headings, etc.). The syllabus will address the needs of students with disabilities. Extended test times will be provided for online assessments when they are required for individual students. Additionally, the instructor will work with DSPS to ensure accessibility of course content to students with disabilities. Any publisher materials are (or have been) evaluated by DSPS and any portions of the materials that are not accessible are assessed and will be appropriately accommodated.