### EGCC torch logo in blue and Eastern Gateway Community College is under the torch.

### 110 John Scott Highway

**Steubenville, OH 43952**

### Telephone: (740) 264-5591

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| Course Information | |
| Course Title: College Algebra  Credit Hours: 4  Class Location: Online  Course Delivery Format: Online | Course Number: MTH120  Pre-Req: MTH099-Intermediate Algebra or placement score  Meeting Day/Time: |

**Instructor Information**

Name: Dr. Milan Sherman

Contact Information: msherman@egcc.edu

## **Course Description**

This course covers linear, quadratic, and absolute value equations and inequalities, graphs of elementary functions and non-functions, graphing of polynomial and rational functions, zeros of polynomial functions including the Fundamental Theorem of Algebra, exponential and logarithmic functions including graphs and applications, conic sections, systems of equations using matrices, and matrix algebra. Meets the general education requirement for AA degree.

## **Course Learning Outcomes**

1. Solve a variety of equations and inequalities (includes: linear, quadratic, rational, higher degree, radical, and absolute value)
2. Graph and locate intercepts of linear, quadratic, higher degree polynomial, piece-wise, rational functions.
3. Understand the relationship between exponential and logarithmic functions.
4. Graph the conic sections.
5. Solve a system of linear equations by using substitution, elimination (addition) and matrices.
6. Understand the basic concepts of matrix algebra.

Course Objectives

**Topic I Equations and Inequalities**

1. The student will be able to solve an equation in one variable.
2. The student will be able to solve a linear equation.
3. The student will be able to solve equations that lead to linear equations.
4. The student will be able to translate verbal descriptions into mathematical expressions.
5. The student will be able to solve an interest, mixture, uniform motion or constant rate application problem.
6. The student will be able to solve a quadratic equation by factoring, completing the square, and using the quadratic formula (includes applications).
7. The student will be able to solve a radical equation.
8. The student will be able to use interval notation.
9. The student will be able to solve linear inequalities.
10. The student will be able to solve equations and inequalities involving absolute value.
11. The student will be able to use the distance and midpoint formulas.
12. The student will be able to graph equations by plotting points.
13. The student will be able to find intercepts from a graph and an equation.
14. The student will be able to graph a line.
15. The student will be able to calculate slope of a line.
16. The student will be able to use the slope-intercept and point-slope form of a line.
17. The student will be able to write an equation of a line.
18. The student will be able to define parallel and perpendicular lines.
19. The student will be able to find equations of parallel and perpendicular lines.
20. The student will be able to add, subtract, multiply and divide complex numbers.
21. The student will be able to solve a quadratic equation with a negative discriminant.

##### **Topic II Functions and Their Graphs**

1. The student will be able to determine whether a relation represents a function.
2. The student will be able to find the value of a function.
3. The student will be able to find the domain of a function.
4. The student will be able to identify the graph of a function.
5. The student will be able to obtain information from or about the graph of a function.
6. The student will be able to use a graph to determine where a function is increasing, decreasing, or constant.
7. The student will be able to use a graph to locate local maxima and minima.
8. The student will be able to determine even and odd functions from a graph and an equation.
9. The student will be able to graph functions listed in the library of functions.
10. The student will be able to graph piecewise-defined functions.
11. The student will be able to graph functions using horizontal and vertical shifts.
12. The student will be able to graph functions using compressions and stretches.
13. The student will be able to graph functions by using reflections.
14. The student will be able to form the sum, difference, product, and quotient of two functions.
15. The student will be able to perform composition given two functions.
16. The student will be able to determine the inverse of a function.
17. The student will be able to obtain the graph of the inverse functions from the graph of the function.
18. The student will be able to find the inverse function .

###### **Topic III Linear Functions**

1. The student will be able to represent a linear function.
2. The student will be able to determine whether a linear function is increasing, decreasing, or constant.
3. The student will be able to interpret slope as a rate of change.
4. The student will be able to write and interpret an equation for a linear function.
5. The student will be able to graph linear functions.
6. The student will be able to determine whether lines are parallel or perpendicular.
7. The student will be able to write the equation of a line parallel or perpendicular to a given line.
8. The student will be able to build linear models from verbal descriptions.
9. Identify the strength of the linear association between two variables by examining the value of the correlation.
10. The student will be able to model a set of data with a linear function.
11. The student will be able to draw and interpret scatter plots.
12. The student will be able to recognize interpolation or extrapolation.
13. The student will be able to distinguish between linear and nonlinear relations.
14. The student will be able to use the linear model to make predictions.

###### **Topic IV Polynomial and Rational Functions**

1. The student will be able to graph a quadratic function by including the vertex and intercepts.
2. The student will be able to find the maximum or minimum value of a quadratic function.
3. The student will be able to identify polynomials and state the degree.
4. The student will be able to graph a polynomial (includes graphing calculator).
5. The student will be able to determine the zeros of a polynomial and state the multiplicity.
6. The student will be able to find the domain of a rational function.
7. The student will be able to determine the vertical, horizontal, or oblique asymptotes of a rational function.
8. The student will be able to analyze the graph of a rational function.
9. The student will be able to perform synthetic division.
10. The student will be able to use the remainder and factor theorems.
11. The student will be able to use Descarte’s Rule of Signs.
12. The student will be able to use the Rational Zero theorem to list the possible rational zeros.
13. The student will be able to find the real zeros of a polynomial function.
14. The student will be able to solve polynomial equations.

###### **Topic V Exponential and Logarithmic Functions**

1. The student will be able to obtain the graph of the inverse functions from the graph of the function.
2. The student will be able to find the inverse function .
3. The student will be able to evaluate exponential functions.
4. The student will be able to graph an exponential function (includes graphing calculator).
5. The student will be able to define the irrational number .
6. The student will be able to solve an exponential equation.
7. The student will be able to change from exponential form to logarithmic form and vice versa.
8. The student will be able to evaluate a logarithmic function.
9. The student will be able to graph a logarithmic function (includes graphing calculator).
10. The student will be able to solve logarithmic and exponential equations.
11. The student will be able to work with the properties of logarithms.
12. The student will be able to write a logarithmic expression as a sum or differences of logarithms.
13. The student will be able to write a logarithmic expression as a single logarithm.
14. The student will be able to evaluate logarithms whose base is neither 10 nor by using the change of base formula.
15. The student will be able to solve logarithmic equations using properties of logarithms.
16. The student will be able to solve applied problems involving exponential and logarithmic equations (includes compound interest, growth and decay).

###### **Topic VI Systems of Equations and Inequalities**

1. The student will be able to solve a system of linear equations by using substitution, elimination, matrices and inverses.
2. The student will be able to perform row operations on a matrix.
3. The student will be able to find the sum, difference, scalar multiplication, product, and inverse of matrices.

###### **Topic VII Analytic Geometry / Conic Sections**

1. The student will know the names of the conics.
2. The student will be able to graph a circle.
3. The student will be able to find the center and radius of a circle.
4. The student will be able to find the equation of a parabola, ellipse, and hyperbola.
5. The student will be able to graph a parabola by including the vertex, focus, and directrix.
6. The student will be able to graph an ellipse by including the center, vertices, and foci.
7. The student will be able to graph a hyperbola by including the center, vertices, foci, and asymptotes.

## **Course Requirement**

Appropriate score on ACT, SAT, or college placement test (COMPASS or Accuplacer) or MTH099-Intermediate Algebra with a minimum grade of “C”.

**Please do not attempt to take this course without successfully completing introductory & intermediate algebra** (students should already have knowledge of factoring, solving linear equations, writing equations of lines, rational expressions, inequalities, systems of equations, radicals, complex numbers, quadratics, and an intro to functions)**.**

## **Course Expectations**

You must be willing and able to commit to at least 6 to 12 hours per week per online course. Online courses are ***not*** easier than the traditional course. Once you fall behind, it is difficult to catch up. You must have self-discipline and dedication. If you cannot make the time commitment then an online course is probably not for you. You will need to set time aside each day to log on and complete assignments and participate. Weekly attendance will be taken each Monday. **You must show progress each week on your MyOpenMath account linked through Canvas**.

Homework is graded. Doing the homework is ***very*** beneficial to the learning process. It gives you an idea of what to expect for tests. Please take notes while you are working through each section.

**At the end of each chapter you will take a test. Tests are to be worked by the individual enrolled in the class.**

**You must submit your handwritten work for all chapter tests & the final exam to your instructor (show all your work including the final answer). Your problems *must* be numbered. You may take a picture of your work with your smart phone or scan your work & email it to your instructor or submit through your Canvas site. You only have 24 hrs after you complete each test to submit your handwritten work. No Work = No Credit. The instructor has the option of giving the student a score of 0% if work in not submitted within the 24 hr time frame.**

Any student with a disability, either physical or psychological, should inform the instructor by the end of the first week of class so that reasonable accommodations can be made if possible and practical. It is the student’s responsibility to inform the instructor of any such needs.

Students must complete all assignments by the given deadlines. The students should work through the homework until they are confident with the material. Then, the student should attempt the tests.

There are **videos (please watch)** **and helpful hints** for each section for viewing. Each lesson includes a video lesson with practice questions to follow. These are intended to give you practice prior to working through the homework assignment. Your grade on these practice problems will not be factored into your overall grade in the class. Feel free to work through these questions as many times as you feel is necessary before beginning to work on your homework assignment.

Individual assistance from the instructor can be obtained by asking a specific question via e-mail or clicking on the “Message instructor about this question” link. Additional free tutoring is available through the Student Success Center located at the Steubenville & Youngstown campus sites. Online tutoring services are also available through Brainfuse.

## **Assessment Types**

The course grade will be determined as follows:

Homework (three attempts on each question): 39 sections total

Chapter Tests (1 attempt per test with 2 attempts per problem/ 120-minute time limit): 7 tests total

Comprehensive Final Exam (1 attempt per test with 2 attempts per problem/ 180-minute time limit)

Note: Homework counts as 40% of your overall grade and Tests (including the Final Exam) counts as 60% of your grade.

**Please revisit homework problems in each section before taking the actual chapter test.**

**Students must complete the tests and final exam in one sitting. There is no save and return later feature.**

## **Grading Scale**

A: 90-100% B: 80-89% C: 70-79% D: 60-69% F: <60%

## **Course Resources**

***Required Text***

Your textbook (Algebra & Trigonometry, an OpenStax resource) is embedded in your Canvas account. You also need a scientific calculator or graphing calculator (TI83+ or TI84+), notebook, pencils, eraser.

There are apps for graphing calculators such as Calculate84 and Calculator X84. You can also get a 90 day free trial for a TI-83 emulator at

[**https://education.ti.com/en/software/details/en/67346A88B4AA474A93AF527B56CA84D9/ti-smartview-ti-83-plus-fr**](https://education.ti.com/en/software/details/en/67346A88B4AA474A93AF527B56CA84D9/ti-smartview-ti-83-plus-fr)

**All your graded work (homework and tests) will be completed using MyOpenMath (MOM)**

MyOpenMath is integrated in your Canvas account for this class.

**Please check your Canvas site / E-mail for weekly announcements.**

***Required Software***

Internet and device to send pictures or scans of handwritten work for tests.

MyOpenMath will be integrated into Canvas

***Turnitin***

This course may utilize, Turnitin, a plagiarism-detection software for submission of assessments. Turnitin compares submitted work to sources available on the internet, archived databases of essays, journals, books, and other publications, and its database of assessments submitted in the past at Eastern Gateway Community College and other colleges. Work submitted that generates concerns about originality or citation methods will be reviewed by the instructor. Plagiarism is taken very seriously so please familiarize yourself with the Academic Dishonesty Policy.

***Suggested outside reading***

None required

***Course packs***

None required

***Laboratories software***

None required

## **Course and Academic Policies**

***Attendance***

Rules on Attendance in Online Courses

The US Department of Education defines program integrity rules that involve tracking a student's attendance in online classes. Eastern Gateway requires students to participate in all instructional activities as defined by the instructor of the course. Since these courses are fully online, participation is defined differently than in face-to-face classes.

Students who do not maintain active participation, as defined by the instructor of the course, will be dropped from the course and will receive an Instructor Withdrawal. This will affect your financial aid and scholarships.  As long as students meet all course work and attendance requirements as defined by each instructor, students will meet the online attendance requirements. It is the student's responsibility to read the course syllabus, course messages, and course announcements and to be aware of the requirements for each class.

Attendance vs. Nonattendance Comparison

|  |  |
| --- | --- |
| **Attendance Activities** | **Nonattendance Activities** |
| Adhering to due dates | Logging into the course |
| Participating in online discussion forums | Emailing classmates |
| Completing quizzes and tests by the deadline | Planning to complete all assessments at the end of the term |
| Assignment submission before or on due date | Reading course materials |

**Please Note:**

At EGCC, the instructors will drop inactive students and note a last date of attendance. Attendance is not determined as the last day the student logged into the course. Logging in and out of a course does not constitute active participation. Students must complete work as defined by the instructor. Consult your course syllabus, messages, and announcements for your instructor's attendance policy.

Students who do not participate in class, that is, who consistently do not complete assignments, quizzes, respond to forums or turn in other work, will be notified that they may be dropped or withdrawn from the class for non-participation.

Weekly attendance is mandatory in all online/hybrid courses. Students are expected to log into their online course(s) weekly. However, simply logging into an online course does not constitute attendance. Progress towards satisfactory completion of weekly assignments is expected on a weekly basis. No progress could jeopardize good standing and financial aid.

*Academic Withdrawal*

Students in traditional face-to-face courses will be academically dropped from a course for never attending the first two weeks of the course meeting during the semester if they have not made prior arrangements with faculty.

Students in online/hybrid courses will be academically dropped from courses for never participating (completing an assignment/discussion) in the first two weeks of the course meeting during the semester if they have not made prior arrangements with faculty.

There will be no letter grade on the student’s transcript and the student’s class load will be reduced by the course credits, and this may affect his/her full-time or part-time student status. If a student has been dropped due to this attendance policy, the faculty may reinstate the student only if the faculty made a mistake or the student verifies extenuating circumstances beyond his/her control.

Students also may be academically withdrawn during the third through the tenth week of the semester for excessive, continuous or cumulative absences (one consecutive week of a course meeting time or five or more absences in a 10 week or less period of time).

A faculty member may choose to initiate the academic withdrawal for excessive, continuous, or cumulative absences if, as specified in the course syllabus, the minimum course objectives cannot be met due to the student’s excessive absences or lack of assignment completion in online/hybrid courses. Such action may be taken after the faculty member has attempted to notify the student on three different occasions by Early Alert, phone, email, mail, or in other courses that excessive absence has potentially placed the student in academic jeopardy. There is no forgiveness of tuition and fees for an academic withdrawal and the withdrawal will be recorded on the student’s transcript with a “W.” If the student has been withdrawn due to this attendance policy, the faculty may reinstate the student only if the faculty made a mistake or the student verifies extenuating circumstances beyond his/her control.

***Make-Up Work***

All work is expected to be completed by the given deadlines on the syllabus. Please contact your instructor if an unforeseen circumstance prevents you from completing work by the due date.

***Extra Credit***

None

***Academic Dishonesty***

Student integrity and scholastic honesty are an integral part of the College’s scholastic standard, academic quality, and a foundation for our society.

The College will not tolerate the breach of this integrity through cheating, plagiarism, or other forms of academic dishonesty. Faculty and staff will take precautions to prevent academic dishonesty, but it is also the student’s joint responsibility to report known infractions to any College employee. Infractions impact the final grade/GPA of all students as well as the reputation of the College and the value of the degree earned. Confirmed violations may result in a failing grade on an assignment(s) or in the course(s).

Repeated incidents of scholastic dishonesty or a flagrant single offense may warrant action beyond a failing grade in the course.

Offenses which may warrant additional disciplinary action including disciplinary probation, professional probation, suspension, or expulsion, include the following:

1. Cheating, plagiarism, or other forms of scholastic dishonesty, including the use, without permission, of tests or other academic material belonging to a member of the college faculty or staff.
2. Furnishing false information to the College with intent to deceive.
3. Forgery, alteration or misuse of College documents, records, or identification cards.
4. Misuse of computer privileges, including unauthorized use of software, an account number, password, program or file. (see Computer Use Procedure)

The student may appeal any actions affecting enrollment or grade using the Student Complaints/Appeals Process described in this catalog. Students should read the Academic Honesty and Student Integrity Policy posted on the College’s web site at www.egcc.edu.

***Accessibilities Services***

Eastern Gateway Community College is committed to providing reasonable accommodations for students with disabilities. Reasonable accommodations may include modification of time allowances for testing and required projects, note-takers, interpreters, approved assistance equipment, and/or access to lecture notes and materials such as overhead slides. Effective and reasonable accommodation in the classroom does not include fundamental alteration of the curriculum, classroom standards, or length of class time. Accommodations will be made on a case-by-case basis by the College.

Students are responsible for notifying the College regarding any disabilities for which they may need special services. The student should make arrangements to speak or meet with the Director of Student Support Services. The Director will assist students in resolving immediate issues, provide assistance with academic concerns, and attempt to answer student questions. Pertinent documentation from a medical professional, psychiatrist, or psychologist must be submitted to the Director and kept on file. Students who are interested should contact the director at **access@egcc.edu**

***Tutoring***

The Steubenville and Youngstown Campuses offer a variety of services to Eastern Gateway students who may be experiencing difficulties. The Student Success Centers off the following services:

*Writing Center*-Located in the Gator Center on the Steubenville Campus and room C101 on the Youngstown Campus, the Writing Center puts students together with tutors for help with writing papers, proofreading, research, documentation, and basic word processing. This is a walk-in service; appoints are not required. Students may bring their works-in-progress to the Writing Center for help during posted hours.

*Math Center*-Located in the Gator Center on the Steubenville Campus and room C101 on Youngstown Campus, the Math Center offers help with any math course offered at Eastern Gateway. Math tutors are available during posted hours on a drop-in basis.

*Online Tutoring*-Online tutoring is available through Brainfuse. The service provides online tutoring access to any Eastern Gateway student both on and off campus. There are several components featured through this service including live help in a variety of courses, 24-hour access to submit a writing assignment to the Writing Lab, academic tools to build skills and support learning, along with collaborative tools to connect students-to-students or instructors-to-student. Brainfuse can be accessed via the Gateway (Student Portal) in the Menu under Tutoring.

Student Success Tutors can be contacted by emailing a tutoring request to **tutoring@egcc.edu.**

## **Tentative Course Schedule**

## **Course Schedule**

Review of Basic Algebra

This module contains a quick review of basic algebra. This section does not count towards your overall average in MTH120-College Algebra. If you are having trouble with this section, please contact your instructor. You might not be ready to take MTH120 at this time.

Chapter 2: Equations and Inequalities

2.1 The Rectangular Coordinate System and Graphs

2.2 Linear Equations in One Variable

2.3 Models and Applications

2.4 Complex Numbers

2.5 Quadratic Equations

2.6 Other Types of Equations

2.7 Linear Inequalities and Absolute Value Inequalities

Chapter 3: Functions

3.1 Functions and Function Notation

3.2 Domain and Range

3.3 Rates of Change and Behavior of Graphs

3.4 Composition of Functions

3.5 Transformation of Functions

3.6 Absolute Value Functions

3.7 Inverse Functions

Chapter 4: Linear Functions

4.1 Linear Functions

4.2 Modeling with Linear Functions

4.3 Fitting Linear Models to Data

Chapter 5: Polynomial and Rational Functions

5.1 Quadratic Functions

5.2 Power Functions and Polynomial Functions

5.3 Graphs of Polynomial Functions

5.4 Dividing Polynomials

5.5 Zeros of Polynomial Functions

5.6 Rational Functions

Chapter 6: Exponential and Logarithm Functions

6.1 Exponential Functions

6.2 Graphs of Exponential Functions

6.3 Logarithmic Functions

6.4 Graphs of Logarithmic Functions

6.5 Logarithmic Properties

6.6 Exponential and Logarithmic Equations

Chapter 11: Systems of Equations and Inequalities

11.1 Systems of Linear Equations: Two Variables

11.2 Systems of Linear Equations: Three Variables

11.3 Systems of Nonlinear Equations and Inequalities: Two Variables

11.5 Matrices and Matrix Operations

11.6 Solving Systems with Gaussian Elimination

11.7 Solving Systems with Inverses

Chapter 12: Analytic Geometry

1.7 Circles

12.1 The Ellipse

12.2 The Hyperbola

12.3 The Parabola

There will be a comprehensive final at the end of the semester. Please take the practice final first.

**Note: The Video Practice problems and the Practice Final Exam do not count towards your final overall average. They were created for extra practice!!**

Course requirements are subject to change at the discretion of the instructor / college. Any change will be communicated to the class by the instructor.

***Handwritten Work Requirements for College Algebra-MTH120***

**Chapter 2 Test**

Problems: 3–11, 13, 15, 16 and 19-29

**Chapter 3 Test**

Problems: 5, 6, 11, 13-15, and 21-23

**Chapter 4 Test**

Problems: 2, 3, 5, and 6

**Chapter 5 Test**

Problems: 1 -3, 5, 6, 11, 14, 15, 17, 18, and 21

**Chapter 6 Test**

Problems: 2, 3,10,11,17, and 19-21

**Chapter 11 Test**

Problems: 1-9, 11, 15, 17, and 18

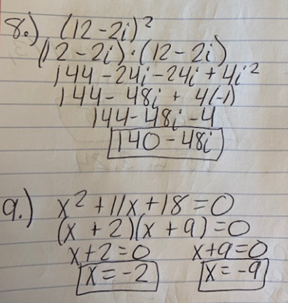
**Chapter 12 Test**

Problems: 4-6, 14, and 17-19

**Final Exam**

Problems: 2, 3, 5, 6, 8-11, 16, 17, 19-24, and 29-31

Example of what handwritten work should look like - ***Neat, organized, and numbered*** ☺



***Spring 2021 – First 8 Week Session – (Monday, January 11th – Sunday, March 7th)***

There are 7 deadlines throughout the session.

Week # 1 Sections 2.1 through 2.7

Week # 2 **Test on Chapter 2**-**Deadline # 1**

In order to stay on track & finish all assignments by the end of the term, you also need to work on Sections 3.1 through 3.5

Week # 3 Sections 3.6 and 3.7, **Test on Chapter 3-Deadline # 2**

In order to stay on track & finish all assignments by the end of the term, you also need to work on Sections 4.1 through 4.3

Week # 4 **Test on Chapter 4–Deadline # 3**

In order to stay on track & finish all assignments by the end of the term, you also need to work on Sections 5.1 through 5.5

Week # 5 Section 5.6, **Test on Chapter 5-Deadline # 4**

In order to stay on track & finish all assignments by the end of the term, you also need to work on Sections 6.1 through 6.5

Week # 6 Section 6.6, **Test on Chapter 6-Deadline # 5**

In order to stay on track & finish all assignments by the end of the term, you also need to work on Sections 11.1 through 11.3 and 11.5

Week # 7 Sections 11.6 and 11.7, **Test on Chapter 11-Deadline # 6**

In order to stay on track & finish all assignments by the end of the term, you also need to work on Sections 1.7 (part of Chapter 12) & 12.1 through 12.3

Week # 8 **Test on Chapter 12, Practice Final, and Final Exam** - **Deadline # 7**

**Deadline # 1: Chapter 2 homework and test must be completed by Sunday, Jan. 24th (11:59 pm Eastern Time)**

**Deadline # 2: Chapter 3 homework and test must be completed by Sunday, Jan. 31st (11:59 pm Eastern Time)**

**Deadline # 3: Chapter 4 homework and test must be completed by Sunday, Feb. 7th (11:59 pm Eastern Time)**

**Deadline # 4: Chapter 5 homework and test must be completed by Sunday, Feb. 14th (11:59 pm Eastern time)**

**Deadline # 5: Chapter 6 homework and test must be completed by Sunday, Feb. 21st (11:59 pm Eastern time)**

**Deadline # 6: Chapter 11 homework and test must be completed by Sunday, Feb. 28th (11:59 pm Eastern time)**

**Deadline # 7: Chapter 12 homework and test plus the Final Exam must be completed by Sunday, March 7th (11:59 pm Eastern Time)**

**Note: Spring Break is Monday, March 8th – Sunday, March 14th**