



Authorizing Signature: _____

Date: _____

LEHIGH CARBON COMMUNITY COLLEGE

MASTER COURSE OUTLINE

for

MAT 160		College Algebra	
School / Division:	Business, Education, Legal, Social Services, Aviation, Science, Engineering, and Mathematics	Mathematics	
Submitted by:	Eric Werley		
Course Origination Date:	1975		
Revision Date:			
Review Date:	2/1/2022		
Prerequisites:	COMPASS-Algebra 66 or SAT Math 650 or College Success Math 107 or ACT Math 29 or Math Waiver 3 or Asset-Algebra 21 or Credit level MAT 105 Minimum Grade of C		
Corequisites:	None		

Credit Hours

Credit/hours Calculations	Credits
Credit Hours (Total)	3
Lecture Hours* 1 hour = 1 credit hour = 1 workload unit	3
Laboratory Hours* 1 hour – 1/3 credit hour = 0.8 workload unit	0
Other/Clinical* 1 hour = 1/75 credit hour	0
*hours per week/14 weeks If # of weeks differs, list here:	

Course Description

Emphasizes such topics as exponents and radicals, factoring, complex numbers, rational expressions, functions and their graphs, shifting, stretching/compressing, and reflecting graphs, inverse functions, solving linear and nonlinear equations and inequalities both algebraically and graphically, polynomial and rational functions, rational zeros theorem, exponential and logarithmic functions, systems of linear and nonlinear equations, and using basic matrix algebra to solve systems of equations.

Course Objective/Competency

MAT 160 follows MAT 105 Intermediate Algebra or an equivalent high school algebra program. It constitutes a necessary preparation for any student intending to take MAT 165 College Trigonometry or MAT 188 Business Calculus. This course covers the necessary algebra for a course in Calculus. Although the theory of algebraic concepts will be covered, the accent will be placed upon problem solving along with some applications.

During this course the student will be expected to:

	Course Learning Objective	College-Wide Competency
1.	Simplify algebraic expressions involving absolute values, polynomials, exponents, radical, rational, exponential, or logarithmic expressions.	Think critically; Apply quantitative reasoning
2.	Solve problems that can be modeled with polynomial, radical, rational, exponential, or logarithmic equations or inequalities.	Think critically; Apply quantitative reasoning
3.	Determine the equations and graphs for functions using various techniques; form combinations, inverses and compositions of functions.	Think critically; Apply quantitative reasoning
4.	Analyze data and solve problems through linear and non-linear regression equations.	Think critically; Apply quantitative reasoning
5.	Find zeros of polynomials using the Rational Zeros Theorem and use that to solve polynomial equations.	Think critically; Apply quantitative reasoning
6.	Solve systems of linear and non-linear equations using substitution and elimination.	Think critically; Apply quantitative reasoning
7.	Use matrices to solve systems of equations.	Think critically; Apply quantitative reasoning

Course Content

Chapter 1

- Quadratic Equations
- Complex Numbers
- Quadratic Equations in the Complex Number System
- Radical Equations
- Equations Quadratic in Form
- Absolute Value Equations
- Factorable Equations

Chapter 2

- Circles
- Variation

Chapter 3

- Functions
- The Graph of a Function
- Properties of Functions
- Difference Quotient
- Library of Functions
- Piecewise-defined Functions
- Graphing Techniques: Transformations
- Mathematical Models: Building Functions

Chapter 4

- Properties of Linear Functions and Linear Models
- Building Linear Models from Data
- Quadratic Functions and Their Properties
- Building Quadratic Models from Verbal Descriptions and from Data
- Inequalities Involving Quadratic Functions

Chapter 5

- Polynomial Functions and Models
- The Real Zeros of a Polynomial Function
- Complex Zeros of a Polynomial Function
- The Fundamental Theorem of Algebra
- Properties of Rational Functions
- The Graph of Rational Functions
- Polynomial and Rational Inequalities

Chapter 6

- Composite Functions
- One-to-One Functions
- Inverse Functions
- Exponential Functions
- Logarithmic Functions
- Properties of Logarithms
- Logarithmic and Exponential Equations
- Financial Models
- Exponential Growth and Decay Models
- Logistic Growth and Decay Models
- Building Exponential, Logarithmic, and Logistic Models from Data

Chapter 12

- Systems of Linear Equations: Substitution and Elimination
- Systems of Linear Equations: Matrices
- Systems of Linear Equations: Determinants
- Matrix Algebra
- Partial Fraction Decomposition
- Systems of Nonlinear Equations

Advisement Comments

This course is for students preparing to take Calculus.

Grading Procedures

The method of presentation will be primarily lecture with as much student participation as time permits. Standard letter grades will be based on quizzes, tests, hand-in homework assignments, and a final examination. Also, MyMathLab must be incorporated into the grading of this course, including homework and/or quizzes.

Textbook(s)

Sullivan and Sullivan, Algebra and Trigonometry – Enhanced with Graphing Utilities, 7th Edition, Pearson, 2017. ISBN: 1323469044

(Student not taking Mat 165 – College Trigonometry are able to purchase the College Algebra portion of this book ISBN: 1323468560)

MyMathLab (ebook alternative) – Required component of the course which includes a digital copy of the textbook.

A graphing calculator is required.

Bibliography

Sullivan and Sullivan, College Algebra – Enhanced with Graphing Utilities, 6th Edition, Pearson – Prentice Hall. 2013

Larson, College Algebra - A Graphing Approach, 5th Edition, Houghton Mifflin.

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Lehigh Carbon Community College

Prefix: MAT No.: 160 Title: College Algebra

Date: 02/08/2022

Course-Specific Student Learning/Collegewide Competencies

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8
Course Learning Objective	Accred. Std. #	Prgm. Obj. #	*CWC #	What tool will be used to measure the objective? (Assessment Method)	What is the criterion for success?	Measurement Tool Grading Scale (Numeric)	How will the measurement outcome be reported?
1. Simplify algebraic expressions involving absolute values, polynomials, exponents, radical, rational, exponential, or logarithmic expressions.			1,3	Chapter 5 Section 3 HW Chapter 6 Section 6 HW	Overall Grade 70% of students achieving 70% or better	1 pass 0 fail	Instructor captured data from MML loaded in to TracDat
2. Solve problems that can be modeled with polynomial, radical, rational, exponential, or logarithmic equations or inequalities.			1,3	Chapter 3 Section 6 HW Chapter 6 Section 7 HW Chapter 6 Section 8 HW	Overall Grade 70% of students achieving 70% or better	1 pass 0 fail	Instructor captured data from MML loaded in to TracDat
3. Determine the equations and graphs for functions using various techniques; form combinations, inverses and compositions of functions.			1,3	Chapter 3 Section 5 HW Chapter 5 Section 5 HW Chapter 6 Section 1 HW Chapter 6 Section 2 HW	Overall Grade 70% of students achieving 70% or better	1 pass 0 fail	Instructor captured data from MML loaded in to TracDat
4. Analyze data and solve problems through linear and non-linear regression equations.			1,3	Chapter 4 Section 4 HW Chapter 6 Section 9 HW	Overall Grade 70% of students achieving 70% or better	1 pass 0 fail	Instructor captured data from MML loaded in to TracDat
5. Find zeros of polynomials using the Rational Zeros Theorem and use that to solve polynomial equations.			1,3	Chapter 5 Section 2 HW	Overall Grade 70% of students achieving 70% or better	1 pass 0 fail	Instructor captured data from MML loaded in to TracDat

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8
Course Learning Objective	Accred. Std. #	Prgm. Obj. #	*CWC #	What tool will be used to measure the objective? (Assessment Method)	What is the criterion for success?	Measurement Tool Grading Scale (Numeric)	How will the measurement outcome be reported?
6. Solve systems of linear and non-linear equations using substitution and elimination.			1,3	Chapter 12 Section 6 HW	Overall Grade 70% of students achieving 70% or better	1 pass 0 fail	Instructor captured data from MML loaded in to TracDat
7. Use matrices to solve systems of equations.			1,3	Chapter 12 Section 2 HW Chapter 12 Section 4 HW	Overall Grade 70% of students achieving 70% or better	1 pass 0 fail	Instructor captured data from MML loaded in to TracDat

CWC KEY: *#1-Think critically; #2-Communicate effectively; #3-Apply quantitative reasoning; #4-Participate cooperatively within a team; #5-Use current technology effectively; #6-Apply information literacy skills; #7-Analyze human diversity; #8-Apply scientific reasoning; #9-Evaluate ethical aspects of decision making

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