



Date		Credits	3
Course Title	College Algebra	Course Number	MAC1105
Pre-requisite (s)	None	Co-requisite (s)	None
Hours	45		

Place and Time of Class Meeting

San Ignacio University
3905 NW 107 Avenue, Suite 301
Miami, FL 33178

Name and Contact Information of Instructor

Book required

(San Ignacio University recognizes the use of the textbook in the classroom as part of the educational methodology and strategy applied in diverse materials. The textbook is part of the curriculum and is used to reach the student in an effective manner in the classroom. Every student is expected to acquire and use the textbook.)

College Algebra: Real Mathematics, Real People 7th Edition

Larson

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Classroom expectations for students

Attendance Policy

Students are expected to attend all scheduled university classes for the courses that they are registered for and to achieve the goals set forth by each class instructor. Attendance is taken daily. Enrolled students are permitted no more than **2** “free” absences in one semester. Students missing **3-5** classes over the course of the semester will receive a one-letter grade deduction from their final course grade; missing more than **6** classes will result in failure of the course regardless of grade average. It is the student's responsibility to arrange to make up work missed because of an absence.

Student Tardiness Policy

A student is considered tardy/late if he/she comes to class 15 minutes late. With three tardies the student accumulates one full absence. If the student misses half of the class period, it is a full absence. When a student has more than 6 tardies, the instructor will contact the San Ignacio University Coordinator of Student Affairs and Academic Department and request an intervention



session with the student. The goal of the intervention session is to develop and implement an intervention program to help students learn new ways to save and manage time.

NOTE: Plagiarism is defined as the use, without proper acknowledgment, of the ideas, phrases, sentences, or larger units of discourse from another writer or speaker. Plagiarism includes the unauthorized copying of software and the violation of copyright laws. Students who commit plagiarism will obtain a grade of “Failure” on their exam or assignment.

Course Description (must correspond exactly to Catalog description)

The purpose of this course is to provide students with critical thinking skills and the ability to solve mathematical functions. Topics will include: Polynomial functions, Rational functions, Exponential functions, Logarithmic functions and Linear systems. Students are expected to engage in an active discovery of mathematical concepts.

Learning Objectives

At the end of this course the student will be able to:

- Graph equations and functions.
- Solve equations and inequalities.
- Understand polynomial and rational functions.
- Solve exponential and logarithmic functions.
- Solve linear systems and matrices.
- Explain sequences, series and probability.
- Understand conics and parametric equations.

Topical Outline and Schedule

DATE	WEEK 1
SPECIFIC OBJECTIVES	<ul style="list-style-type: none"> • Describe the course. • Identify real numbers and the ways to classify them • Define the one-to one correspondence between real numbers and points on number line. • Show how to order real numbers and use inequalities. • Analyze algebraic expressions and how to use the basic rules and principles of algebra • List the absolute values of real numbers and the distance between two

	<p>real numbers</p> <ul style="list-style-type: none"> • Apply the use properties of exponents, radicals, and rational exponents
TOPIC (S)	<ul style="list-style-type: none"> • Discuss the scientific notation to represent real numbers • Define how to simplify and combine radicals • Show how to rationalize denominators and numerators • Describe the use of properties of rational exponents • Identify how to write polynomials in standard form • Examine how to add, subtract and multiply polynomials • Show how to remove common factors from polynomials • Recognize how to factor special polynomial forms, trinomials as product of two binomials and polynomials by grouping <p>Syllabus Discuss Library Orientation Course, Instructor to verify completion</p>
LEARNING ACTIVITIES	<p>Discussion of Syllabus Engage in instructor group led activity Perform mathematical problems</p>
HOMEWORK & ASSIGNED READINGS	<p>Review the Syllabus Complete the Library Orientation Course. Instructor to verify completion.</p> <p>Homework: Chapter P pp. 1-34 P.1 Exercises 1-42 (Even only) P.2 Exercises 1-10 P.3 Exercises 1-24.</p>
DATE	WEEK 2
SPECIFIC OBJECTIVES	<ul style="list-style-type: none"> • Recognize how to find domains of algebraic expressions • Discuss simplifying rational expression • Study adding, subtracting, multiplying and dividing rational expressions • Review how to simplify complex fractions and simplify expressions from calculus • Examine the use of distance formula and midpoint formula
TOPIC (S)	<ul style="list-style-type: none"> • Discuss plot points in the Cartesian plan and sketch scatter plots • Study how to find equation of a circle and translate points in the plane • Examine the use of plots to order and analyze information, histograms to represent frequency distributions and bar graphs and line graphs to represent and analyze data

	<ul style="list-style-type: none"> Discuss how to utilize statistical plotting <p>Discuss Final Class Project List of Topics</p>
LEARNING ACTIVITIES	<p>Participate in a forum. Engage in instructor group led activity Perform mathematical problems in groups</p>
HOMEWORK & ASSIGNED READINGS	<p>Homework: Chapter P pp.35-61 P.4 Exercises 49-86 P.5 Exercises 95-105 P.6 Exercises 1-14</p>
DATE	WEEK 3
SPECIFIC OBJECTIVES	<ul style="list-style-type: none"> Study sketch graphs of equations by point plotting Define graph equations when using a graphing utility and use graphs of equations to solve real-life problems Examine how to find slopes of lines Define functions to model and solve real-life problems Study function terminology Recognize Vertical Line Test functions Determine intervals on which functions increase, decrease or are constant
TOPIC (S)	<ul style="list-style-type: none"> Review the use of slope intercept forms of linear equations to sketch lines Examine the use of slope to identify parallel and perpendicular lines Explain how to write linear equations given points on lines and their slopes Study how to identify whether a relation between two variables represent a function' Define use function notation and evaluate functions and fine domains of functions Examine domains and ranges of functions Study relative maximum and relative minimum values of functions Define graph step functions and other piecewise-defined functions <p>Discussion of student topic selection, library research, tentative bibliography</p>
LEARNING ACTIVITIES	<p>Engage in instructor group led activity Perform mathematical problems in group Discussion of chapter topics</p>
HOMEWORK & ASSIGNED	<p>Investigate concepts and kinds of objectives. Library Research. Develop Tentative Bibliography</p>



READINGS	<p>Due: Project Topic Due: Tentative Bibliography</p> <p>Homework: Chapter 1.1-4 pp. 75-121 Exercises 1-78 pp.118-119 (Even numbers only)</p>
DATE	WEEK 4
SPECIFIC OBJECTIVES	<ul style="list-style-type: none"> • Identify how to recognize graphs of parent functions • Examine the use of vertical and horizontal shifts and reflections to graph functions • Recognize nongrid transformations to graph functions • Discuss the library of commonly used parent functions • Identify the nongrid transformation and how they cause distortion • Identify how to find the compositions of functions • Discuss how to write a function as a composition of two functions • Recognize the use of combinations of functions to model and solve real-life problems
TOPIC (S)	<ul style="list-style-type: none"> • Review the three types of rigid transformations • Describe the sequence of transformations • Study how graphs of functions can be created from combinations of transformations • Discuss the shifts in graph of a function • Recognize how to find equations from graphs • Review how to find inverse functions informally and verify that two functions are inverse functions of each other • Identify the use of graphs of functions to decide whether they have inverse functions • Recognize how to determine whether functions are one-to-one • Discuss how to find inverse functions algebraically <p>Due: Project Topic Due: Tentative Bibliography</p>
LEARNING ACTIVITIES	<p>Engage in instructor group led activity Perform mathematical problems in group Discussion of chapter topics Group activity</p>
HOMEWORK & ASSIGNED READINGS	<p>Continue research and work on final project</p> <p>Homework: Chapter 1-1.5-7 pp.122-147 Exercises p.148 1-80 (Odd numbers)</p>
DATE	WEEK 5



SPECIFIC OBJECTIVES	<p>EXAM I</p> <ul style="list-style-type: none"> • Discuss how to solve an equation that involves fractional expressions, find the least common denominator (LCD) of all terms in the equation and multiply every term by this LCD • Examine how to write and use mathematical models to solve real-life problems • Evaluate common formulas to solve real-life problems • Learn to find the x and y intercepts of graphs of equations
TOPIC (S)	<ul style="list-style-type: none"> • Discuss solutions of equations graphically • Review finding points of intersection of two graphs • Examine use of imaginary unit i to write complex numbers • Discuss how to add, subtract and multiply complex numbers • Identify complex conjugates to write the quotient of two complex numbers in standard form • Examine quadratic equations by factoring, extracting square roots, completing square • Discuss the use of the Quadratic Formula
LEARNING ACTIVITIES	<p>Engage in instructor group led activity Group discussion Discussion of chapter topics</p>
HOMEWORK & ASSIGNED READINGS	<p>Continue research and work on final project</p> <p>Homework: Chapter 2 – 2.1-4 pp. 160-199 Exercises pp.196 1-52 (Even numbers)</p>
DATE WEEK 6	
SPECIFIC OBJECTIVES	<ul style="list-style-type: none"> • Define quadratic equations to model and solve real-life problems • Examine how to solve polynomial equations of degree three or higher • Identify how to solve equation involving radicals, isolating radical on one side of equation and raise each side to appropriate power • Study solving equations involving fractions or absolute values and use polynomial equations and equations involving radicals to model and to solve real-life problems • Review use properties of inequalities to solve linear inequalities
TOPIC (S)	<ul style="list-style-type: none"> • Review how to solve inequalities involving absolute values • Discuss polynomials inequalities • Determine the way to solve rational inequalities • Study inequalities to model and solve real-life problems • Identify what a scatter plot is and how they are constructed and interpret correlation • Review what a linear regression is



	<ul style="list-style-type: none"> Examine the use of scatter plots and graphing utility to find linear models for information
LEARNING ACTIVITIES	Engage in instructor group led activity Perform mathematical problems in group Discussion of chapter topics
HOMEWORK & ASSIGNED READINGS	Homework: Chapter 2.4-2.7 pp. 186-227 Exercises 17-26 pp.229-231
DATE	WEEK 7
SPECIFIC OBJECTIVES	<ul style="list-style-type: none"> Analyze graphs of quadratic functions Review how to write quadratic functions in standard form and utilize results to sketch graphs of functions Identify how to find minimum and maximum values of quadratic functions in real-life applications Review the Linear Factorization Theorem Examine use of transformations to sketch graphs of polynomial functions
TOPIC (S)	<ul style="list-style-type: none"> Discuss Leading Coefficient Test in order to determine the end behavior of graphs of polynomial functions Recognize how to use Intermediate Value Theorem to help find zeros of polynomial functions Review use of zeros of polynomial functions as sketching aids Interpret the use of long division to divide polynomials by other polynomials Discuss synthetic division to divide polynomials by binomials Compare and contrast the Remainder Theorem and Factor Theorem Examine Descartes' Rule of Signs and Upper and Lower Bound rules to find zeros of polynomials Review Rational Zero Test to determine possible rational zeros of polynomial functions
LEARNING ACTIVITIES	Engage in group discussion of chapter topics Perform mathematical exercises from textbook Group discussion
HOMEWORK & ASSIGNED READINGS	Continue research and work on final project Homework: Chapter 3.1-3.3 pp.243-276 Exercises 1-74 pp.277-278 Even only
DATE	WEEK 8
SPECIFIC OBJECTIVES	<ul style="list-style-type: none"> Analyze the Fundamental Theorem of Algebra to determine the number of zeros of a polynomial function



	<ul style="list-style-type: none"> Define all zeros of polynomial functions, including complex zeros Examine how to locate conjugate pairs of complex zeros Discuss how to locate zeros of polynomials by factoring
TOPIC (S)	<ul style="list-style-type: none"> Define domains and vertical and horizontal asymptotes of rational functions Examine use of rational functions to model and solve real-life problems Identify how sketch graphs of rational functions are analyzed, including functions with slant asymptotes Recognize rational functions to model and solve real-life problems Distinguish scatter plots from type of data best used for problem presented Identify quadratic models for data and choosing model that best fits a specific set of data
LEARNING ACTIVITIES	Engage in group discussion of chapter topics Perform mathematical exercises from textbook Group discussion
HOMEWORK & ASSIGNED READINGS	Continue research and work on final project Homework: Chapter 3.4-3.7 pp.281-310 Exercises 1-69 pp.316-317
DATE	WEEK 9
SPECIFIC OBJECTIVES	<ul style="list-style-type: none"> Define two types of nonalgebraic functions: logarithmic functions and exponential functions Evaluate and distinguish exponential functions with base a Identify transcendental functions Evaluate, recognize and graph exponential functions with base e Define the Natural Exponential Function Recognize exponential functions to model and solve real-life problems
TOPIC (S)	<ul style="list-style-type: none"> Evaluate and define logarithmic functions with base a Recognize graph logarithmic functions with base a and recognize and evaluate and graph natural logarithmic functions Review how logarithmic functions are used to model and solve real-life problems Examine the Change-of-Base Formula Define the properties of logarithms Define how to condense logarithmic expressions Recognize how to rewrite logarithms with different bases Identify the different types of properties of logarithms
LEARNING ACTIVITIES	Analysis of the examples raised in class. Engage in group discussion of chapter topics



	Perform mathematical exercises from textbook Group discussion
HOMEWORK & ASSIGNED READINGS	Continue research and work on final project Homework: Chapter 4.1-4.3 pp.323-350 Exercises 1-64 pp.351
DATE	WEEK 10
SPECIFIC OBJECTIVES	<ul style="list-style-type: none"> Review One-to-One Properties and Inverse Properties and how they are used to solve simple exponential or logarithmic equations Recognize how to solve more complicated exponentials and logarithmic equations Identify how exponential and logarithmic equations are used to solve real-life problems Define the five common types of models involving exponential or logarithmic functions: exponential growth model, exponential decay model, Gaussian model, logistic growth model and logarithmic models
TOPIC (S)	<ul style="list-style-type: none"> Examine how exponential growth and decay functions are used in everyday real-life problems and how they help solve them Discuss examples of Gaussian functions, logistic growth functions and logarithmic functions in real-life problems Discuss how exponential models can be used in a graphing utility for finding data
LEARNING ACTIVITIES	Analysis of the examples raised in class. Engage in group discussion of chapter topics Perform mathematical exercises from textbook
HOMEWORK & ASSIGNED READINGS	Continue research and work on final project Homework: Chapter 4.4-4.6 pp.354-381 Exercises p.1-50 Even only
DATE	WEEK 11
SPECIFIC OBJECTIVES	<p>MIDTERM EXAM II</p> <ul style="list-style-type: none"> Define methods of substitution and graphing to solve systems of equations in two variables Identify how to use systems of equations in real-life situations Define the method of elimination to solve systems of linear equations in two variables Recognize how to graphically interpret the number of solutions of a system of linear equations in two variables Interpret how systems of linear equations in two variables can be utilized in real-life problems
TOPIC (S)	<ul style="list-style-type: none"> Examine the use of Gaussian elimination in order to solve systems of

	<p>linear equations</p> <ul style="list-style-type: none"> • Contrast how the number of equations differs from number of variables in a nonsquare system • Discuss how a three-dimensional coordinate system can bring solutions of equations in three variables • Recognize the systems of linear equations to write partial fraction decompositions of rational expressions • Interpret how a system of linear equations in three variables can be used in real-life situations • Define Elementary Row Operations • Examine matrices and Gaussian elimination to solve systems of linear equations
LEARNING ACTIVITIES	<p>Analysis of the examples raised in class. Engage in group discussion of chapter topics Perform mathematical exercises from textbook</p>
HOMEWORK & ASSIGNED READINGS	<p>Chapter 5.1-5.4 pp.398-440 Exercises 1-53 Odd only</p>
DATE	WEEK 12
SPECIFIC OBJECTIVES	<ul style="list-style-type: none"> • Identify how it is determined whether two matrices are equal • Discuss adding, subtracting matrices and multiplying matrices by scalars • Examine how to use matrix operations to model and solve real-life problems • Discuss how two matrices are inverses of each other and how to use Gauss-Jordan elimination to find inverses of matrices
TOPIC (S)	<ul style="list-style-type: none"> • Discuss how to find determinants of 2 x 2 matrices and the formula to find the inverses • Recognize minors and cofactors of square matrices and find determinants of square matrices • Identify use of determinants to find areas of triangles and to decide whether points are collinear • Discuss Cramer's Rule to solve systems of linear equations • Examine how matrices are used to encode and decode messages
LEARNING ACTIVITIES	<p>Analysis of the examples raised in class. Engage in group discussion of chapter topics Perform mathematical exercises from textbook</p>
HOMEWORK & ASSIGNED	<p>Chapter 5.5-5.8 pp.446-465 Cumulative Test 1-46 p. 495</p>

READINGS	
DATE	WEEK 13
SPECIFIC OBJECTIVES	<ul style="list-style-type: none"> • Define sequences and series and their usefulness in modeling sets of values in order to identify patterns • Compare and contrast infinite sequence and finite sequence • Examine how a sequence is defined recursively • Discuss the well-known recursive sequence known as the Fibonacci Sequence • Discuss summation notation and how it relates to a finite sequence
TOPIC (S)	<ul style="list-style-type: none"> • Discuss the use of factorial notation • Identify how summation notation is used to write sums • Identify nth partial sums of arithmetic sequences • Define how to find sums of infinite series and infinite geometric series
LEARNING ACTIVITIES	<p>Analysis of the examples raised in class. Engage in group discussion of chapter topics Perform mathematical exercises from textbook</p>
HOMEWORK & ASSIGNED READINGS	<p>Editing & Revision of Final Project Chapter 6.1-6.3 pp. 500-524 Exercises 1-54 pp.552-553 Even only</p>
DATE	WEEK 14
SPECIFIC OBJECTIVES	<ul style="list-style-type: none"> • Apply the Binomial Theorem to calculate binomial coefficients • Examine the use of binomial coefficients to write binomials expansions • Discuss Pascal's Triangle and how it is used to calculate binomial coefficients • Determine how to solve simple counting problems • Define how the Fundamental Counting Principle can be used to solve more difficult counting problems
TOPIC (S)	<ul style="list-style-type: none"> • Discuss the use of permutations to solve counting problems and combinations to solve counting problems • Identify how to determine the probabilities of events, mutually exclusive events and independent events • Compare and contrast the different ways of probabilities of events
LEARNING ACTIVITIES	<p>Analysis of the examples raised in class. Engage in group discussion of chapter topics Perform mathematical exercises from textbook</p>
HOMEWORK & ASSIGNED READINGS	<p>Editing & Revision of Final Project Chapters 6.4-6.6 pp. 529-551 Exercises 1-35 p.558</p>



	Chapter Test 1-27 p.561
DATE	WEEK 15
SPECIFIC OBJECTIVES	<p>Final Project Final Presentation Final Exam</p> <ul style="list-style-type: none"> • Recognize a conic as the intersection of a plane and double-napped cone • Discuss the four basic conics • Define a degenerate conic • Compare and contrast the different types of conics • Determine how to write equations of circles in standard form • Examine the standard form of equations of parabolas • Determine when a line is tangent
TOPIC (S)	<ul style="list-style-type: none"> • Discuss the reflective property of parabolas and how it can be used to solve real-life problems • Define properties of ellipses and how to write equations of ellipses in standard form • Determine how to find eccentricities of ellipses • Analyze the use of properties of hyperbolas to solve real-life problems • Classify conics from their general equations • Identify ways of graphing curves that are represented by sets of parametric equations • Review how to eliminate the parameter in a pair of parametric equations
LEARNING ACTIVITIES	<p>Analysis of the examples raised in class. Engage in group discussion of chapter topics Perform mathematical exercises from textbook Discuss chapter topics of all semester</p>
HOMEWORK & ASSIGNED READINGS	<p>Chapter 7 pp.565-600 Exercises 7.1 1-12 p.573 Exercises 7.2 1-8 p. 583 Exercises 7.3 21-36 p.593 Cumulative Test 1-33 p.611-612 Odd only</p>

Instructional Methods

In developing methodological strategies, it is best to discuss them between teachers and students in an environment of freedom and mutual agreement in order to ensure that the students make



them their own and take responsibility for their execution and for attaining the goals of this course.

The following strategies may be used in this class:

1. A review of the exercises at the end of each chapter.
2. Check of the reading.
3. Analysis of assigned readings.
4. Group discussions.
5. Individual and group discussions.
6. Preparation of reports.
7. Preparation of a didactic plan.
8. Carrying out a micro-class.

Additional Instructional Materials and References

- Algebra for University students by Margaret L. Lial (7th 12)
- Algebra Form/Function by William G. McCallum (10)
- Beginning Algebra by Richard N. Aufman (8th 13)

Assessment Criteria and Methods of Evaluating Students

96 – 100%	→ A
90 – 95%	→ A-
87 – 89%	→ B+
83 – 86%	→ B
80 – 82%	→ B-
77 – 79%	→ C+
73 – 76%	→ C
70 – 72%	→ C-
67 – 69%	→ D+
63 – 66%	→ D
60 – 62 %	→ D-
< 59%	→ F

Do not count on a curve!

Generally, the grades “A” through “C-” are considered passing grades. Grades “W” and “I” indicate that no grades were earned for the course. A “W” grade indicates that the student withdrew from the course. An “I” grade indicates that the student was passing the course, but failed to complete all the required course work. The instructor, in his/her discretion may grant an “I” grade instead of an “F”, pending completion of the course work by the student within a specified time arranged by the instructor and told to the student. It is the student's responsibility to follow-up with the instructor to complete the course work. If the course work is not completed by the arranged time, the “I” grade becomes an “F”.



Distribution of Grade Elements

Homework: 15% (5% each)

Exams I, II, III: 30% (10% each)

Final Presentation: 30% (15% each)

Final Research Project: 25%

Total: 100 %

Date Syllabus Was Last Reviewed: 05-05-2016