This course syllabus is intended as a set of guidelines for College Algebra. Both North Lake College and your instructor reserve the right to make modifications in content, schedule, and requirements as necessary to promote the best education possible within prevailing conditions affecting this course.

Instructor Information
Instructor’s Name: Dr. Oksana Zhuk
Email Address: ozhuk@dcccd.edu
Office Phone Number: 972-273-3500
Office Location: P330

Course Information
Course title: College Algebra
Course number: MATH 1414
Section number: 7059
Credit hours: Four (4)
Class meeting time: MWF 11:15 – 12:30 in N123

Attendance at this scheduled time is mandatory

Course description: This course is a study of relations and functions including polynomial, rational, exponential, logarithmic, and special functions. Other topics include absolute value equations and inequalities, complex numbers, circles, systems of equations and inequalities, sequences and series, matrices, theory of equations, proofs, and applications.

Course prerequisites: DMAT-0093 or DMAT-0099 (Intermediate Algebra) with an A, B, or C, or an appropriate score on a mathematics placement test.
Required Textbook and Materials

1) **College Algebra MLP Package for North Lake College**
   Includes Access to MyLabsPlus and College Algebra Text, 4th ed, by Beecher & Penna
   ISBN: 1256121819

   *Note: MyLabPlus access code is NOT the same as the MyMathLab access code. The MyLabsPlus is accessed with the MyMathLab – *Plus* access code.

2) **Calculators**
   You will be allowed to use calculators on all tests. Graphing calculators (such as the TI-83 or TI-84 Plus) are recommended. **Calculators such as the TI 89 & TI 92, which perform algebraic operations, are not allowed.** You may check out a TI-84 calculator for the midterm and final at North Lake College. Please verify the calculator policy for other campuses by calling the appropriate testing center.

Technical Support
MyLabsPlus support website:  http://www.mylabsplus.com/support

A link to this site is available on eCampus.

Technical support number for eCampus:  972-669-6402
Technical support number for MyLabsPlus:  1-888-883-1299

Course Objectives
To develop a further understanding of the process of learning mathematics, the factors which can interfere with learning, and to continue to build the algebraic skills necessary for future courses or for utilization in a career or other endeavor.

The objective of the mathematics component of the core curriculum is to develop a quantitatively literate college graduate. Every college graduate should be able to apply basic mathematical tools in the solution of real-world problems.

Specific Course Learning Outcomes

1. The student will set up and solve a variety of equations and inequalities from real world applications. **EEO’s 1, 2. CCIC critical thinking. General Ed. Outcomes: 1.1, 2.1, 2.2**

2. The student will use the geometric concepts from the distance formula, midpoint formula, and slope as a rate of change to derive equations of lines and circles. **EEO’s 1, 2, 3. CCIC critical thinking. General Ed. Outcomes: 1.1, 2.1, 2.2**

3. The student will use the library of functions to graph transformations, perform operations and compositions on the functions along with their inverses. **EEO’s 1, 2, 5. CCIC critical thinking. General Ed. Outcomes: 1.1, 2.1, 2.2**

4. Students will incorporate various theorems to solve and graph polynomial and rational equations and inequalities. **EEO’s 1, 3, 5. CCIC critical thinking. General Ed. Outcomes: 1.1, 2.1, 2.2**

5. The student will apply the properties of exponents and logarithms to solve applications involving compound interest, exponential growth and decay and other real world applications. **EEO’s 1, 7. CCIC critical thinking. General Ed. Outcomes: 1.1, 2.2, 2.2**
6. The student will solve applications involving systems of linear equations using algebra and graphs. EEO’s 1,2, 4. CCIC critical thinking. General Ed. Outcomes: 1.1, 2.1, 2.2

7. The student will use the definitions of sequences and series to set up arithmetic and geometric sequences and find the sums for both finite and infinite series. EEO’s 1,2, 6. CCIC critical thinking. General Ed. Outcomes: 1.1, 2.1, 2.2

**Means of Assessment of Course Learning Outcomes**

Course Learning Outcomes will be assessed by a variety of means.

1. A written exam or Mastery test in MyLabsPlus will be given to assess each Learning Outcome.
2. Homework will be assigned and assessed using the software component.
3. Observation of students as they interact in groups and discussions will be used to assess all outcomes.
4. Students will complete projects and learning activities that will address specific course learning outcomes.

**Course Outline**

Please see Appendix attached to this syllabus for a complete and detailed course outline.

**Evaluation Procedures of Course Learning Outcomes**

The learning outcomes will be assessed through Group Work (projects), Homework, Quizzes and Exams. The final grade will be based on the following:

**Computing Your Grade:**

- Daily work 15% Includes homework, quizzes, attendance (5%), Mastery Tests 10%
- Written Chapter tests 65%
- Final Exam 20%

**Grading Scale**

Your course grade will be determined by the final grade average based on the following:

- A = 90 – 100
- B = 80 – 89
- C = 70 – 79
- D = 67 – 69
- F = 0 – 66

**Homework**

Homework is the most important learning tool in a course. The instructor’s role of facilitating learning is greatly enhanced for the student who has attempted the homework. The classroom environment is more favorable for learning when the student has studied the material in the text, has tried to work the problems, and uses the classroom to get supplementary information and assistance that is not available in the text. *Each homework assignment is anticipated to require approximately 2 hours to complete in addition to 1 hour of content review (this means reading the textbook and going over class notes) for a total of 3 hours per class hour – that means 3 times 4 which is 12 additional hours OUTSIDE of class time.*

Summary of Time Requirement:
• You can expect to spend a **minimum of 12 hours per week** on this class.
• The 12 hours = 4 hours of class time + at least 8 additional hours outside of class working through the material and homework.
• **Most students will need the 4 hours of class + the full 12 additional hours outside of class for a total of 16 hours.**
• **If you cannot donate this amount of time to math homework, your success will be diminished.**

This course requires MyLabsPlus for homework assignments.
- Allow yourself enough time to complete the homework.
- **In order to be prepared for the written tests, it is recommended that you earn a 100% on each homework assignment. Use the Similar Exercise button to re-work an incorrect problem.**
- Homework must be completed before the chapter test is taken.

Students should maintain a HW notebook.
- This means that you should copy the problem, work the problem, and enter your answer in MyLabsPlus.
- Maintaining a HW notebook will give you more examples to review when preparing for an exam.
- The notebook will also help you practice the proper way to communicate and show your work.
- You may be asked to present your written HW at any time throughout the semester.
- You should label each section, copy the problem, neatly show your work vertically, and clearly indicate your final answer.
- **Homework will be counted in the Daily Work Ave. The Daily Work Ave. counts as 15% of your final course grade.**

**Project/Learning Activities**
- Periodically you will be expected to complete a project and/or additional assignments.
- If you are absent on the day these assignments are given, it is your responsibility to get the information from eCampus and turn it in to your instructor on the next class day.
- A late penalty may apply.
- **These assignments will count be included in your daily work grade.**

**Attendance and Quizzes**

All students are expected to attend all classes at the scheduled time. Quizzes will be given at the beginning or end of class. It may or may not be announced so it is important to be prepared, be on time, and stay for every class. Quizzes will cover material discussed during the previous class. These quizzes must be finished within the time allotted. **There will be no makeup quizzes.** You will receive a zero if you miss a quiz because you are absent or tardy. The two lowest scores may be dropped at the end of the semester (the exact number of dropped quiz grades will be determined by the instructor and will be based on the number of quizzes that are given). **The purpose of these quizzes is to check attendance, help keep you on track, and for the instructor to determine your comprehension of course material so that you can be successful in this course. Attendance and quizzes will be a part of the daily work grade.**
Testing
Mastery Tests:
- You will be required to take a mastery test before each written exam.
- The mastery tests will serve as your test review for each written test.
- You will have limited attempts and a deadline to take each mastery test.
- Your deadline will be announced in class.
- The highest grade on each mastery test will be used to determine your mastery test average.

- The mastery test average will be included in your Daily work grade.

Written Tests:
- All written tests will be taken in the testing center.
- Students will login to the appropriate online location and the Test Center personnel will enter the required password for the exam.
- Once the exam comes up on the screen, the student will write out their work on paper supplied by the Test Center. You should request graph paper as needed.
- The paper portion of the exam will be attached to the Test Permit Form
- The written tests are the largest single portion of the final course grade.
- All written tests will be graded according to the Guidelines for Homework Assignments and All Tests (see Appendix).
- You are required to use proper algebraic techniques on each test. Improper algebraic steps may result in a loss of all or partial points.
- Answers only will receive little, if any credit.
- The instructor reserves the right to make test schedule changes.
- If you are unable to take a test at the scheduled time, please make prior arrangements with the instructor.
- You will take the test in the Testing Center, Room A425, on or before the regularly scheduled test dates.
- To take a test in the Testing Center you will need to supply a photo ID (preferably your North Lake College ID), your student ID number, your instructor’s name, and the course number and section. For detail Testing Center policies, see Discipline/Course/Dept/Policies in syllabus.
- Calculators may be used on all tests.
- Written tests will be 65% of your course grade.

Students who miss the test deadline will have to choose one of the options given in "Retests" in order to replace the zero.

You will not be allowed under any circumstances to take more than 2 tests during the last week of the semester.

Retests
Retests will not be given on any exam. Students who want to raise their score may:
1. Take an optional midterm exam that will replace the lowest test score from the first half of the course
2. Use the final exam score to replace the lowest test score from the second half of the course.

Final Exam
The final exam is comprehensive. The exam will be taken in the classroom at the time specified in the Official Final Exam Schedule. *The final exam is 20% of your final course grade.*

**Discipline/ Course/ Department/Policies**

**ABSENCES/TARDIES:** Absences are generally detrimental to one’s performance in a course. You are expected to attend regularly in order that you may increase your chances for a successful semester in algebra. If you must miss a class, it is your responsibility to make up any missed work. Tardiness is strongly discouraged as it is disruptive to the class and thus the students who are on time. It is better to come late than not at all, however, as long as it is not a habit with one particular individual. If you anticipate a particular problem, please discuss it with me before or after class.

**CELL PHONE USE:** The use of cell phones or other similar devices is prohibited during class time. You are expected to turn OFF all such devices BEFORE entering the classroom. You may be asked to leave class if your cell phone causes you or others to be distracted in class i.e. contact calls or texting.

**CLASSROOM BEHAVIOR:** Distractive talking or any disorderly conduct is prohibited. Please be courteous of others. A warning will be given for behavior an instructor considers disruptive and if the warning is not heeded, the student will be asked to leave. See Student Code of Conduct for more details.

**Taking Tests in the Testing Center (A 425)**

- You may not bring personal items into the Test Center. This includes bags, cell phones and pagers. Coin-reimbursable (quarter) lockers are available for student use. **Please do not share lockers.**
- Please show courteous and cooperative behavior while using the services provided by the Testing Center.
- **Do not bring children to the testing center.** You must make arrangements for the care of your children prior to your exam date. The police department will be notified of any unattended children.
- **Do not** take any testing materials with you when you leave the Testing Center. This includes the test, answers, charts, scratch paper. These items will be attached to your test.
- **Academic Dishonesty**
  The Dallas County Community District has established **procedures and guidelines** to protect the security and integrity of all exams. All incidents of academic dishonesty are documented and reported to the instructor, the Director of Testing and the Dean of Student Enrollment.

- **Hours of Operation:**
  **Monday – Thursday:** 8:30 a.m. – 8:00 p.m.
  No tests will be issued after 7:00 p.m. Other cut-off times may be in effect for specific exams by the instructor's direction. All exams collected at 8:00 p.m.

  **Friday - Saturday:** 8:30 a.m. – 3:30 p.m.
  Other cut-off times may be in effect for specific exams by the instructor's direction.
  No tests will be issued after 2:30 p.m. All exams collected at 3:30 p.m.

  **Sunday: CLOSED**

- If your instructor requires you to complete an exam in the Testing Center, be sure to have the following information when you request your test:
• Instructor’s name
• Subject and course number…MATH 1414
• Exam number (1st, 2nd, 3rd, etc.)
• Exam deadline (Get this information from your instructor. The testing staff can not “look up” this information on computers.)

• You should also bring the following supplies:
  • Pencil & Eraser
  • A Test Request Form initialed by your instructor must be completed before entering the Testing center.
  • Only battery operated 4 function, non programmable scientific or TI83/TI84 calculators are allowed (if permitted by instructor).
  • Money for coin-return lockers (quarter). Please do not share lockers.

• Important: Government- or school-issued photo identification is required & enforced.

• Questions? Please visit the Testing Center (A425) or call 972-273-3160.

New Testing Policy for Mathematics & Science Division:

Students taking tests in math and science will NOT be allowed to leave the testing center or the classroom during a test and return to complete the test.

If you leave, you are finished testing.

If you need special accommodations, you must submit a request to the Disability Services Office in person (A430) or by phone at 972-273-3165. For more information, visit http://www.northlakecollege.edu/services-and-resources/advice-and-assistance/Pages/disability-services.aspx

MATH LEARNING CENTER (Math Lab) HOURS (C -211)
Math Lab Resources: free tutoring, lecture series on CD and other resources – drop by and ask.
  8:00 am – 8:00 pm, Monday – Thursday
  8:00 am – 2:00 pm, Friday
  9:00 am – 2:00 pm, Saturday
  CLOSED on Sunday

INSTITUTIONAL POLICIES

ACADEMIC DISHONESTY
The Student Code of Conduct prohibits academic dishonesty and prescribes penalties for Violations. According to this code, which is printed in the college catalog, "academic dishonesty, includes (but is not limited to) cheating, fabrication, facilitating academic dishonesty, plagiarism, and collusion".

Academic dishonesty may result in the following sanctions, including, but not limited to:
1. A grade of zero or a lowered grade on the assignment or course.
2. A reprimand.
3. Suspension from the college.
MATH DEPARTMENT POLICY:
1. A grade of zero will be given on the assignment for the first occurrence of dishonesty.
   Retests or make-ups are not allowed on the assignment.
2. A grade of F will be given for the course after a second occurrence of dishonesty.
3. Other disciplinary action can be taken as determined by the college.

NOTIFICATION OF ABSENCE DUE TO RELIGIOUS HOLY DAY(S)
Students who will be absent from class for the observance of a religious holiday must notify the
instructor in advance. Please refer to the Student Obligations section of the college catalog for
more explanation. You are required to complete any assignments or take any examinations
missed as a result of the absence within the time frame specified by your instructor.

REQUIREMENTS OF THE AMERICANS WITH DISABILITIES ACT
North Lake College provides academic accommodations to students with disabilities, as
defined under ADA law. It is the student's choice and responsibility to initiate any request for
accommodations. If you are a student with a disability who requires such ADA accommodations, please contact North Lake College's Disability Services
Office in person (A430) or by phone at 972-273-3165.
http://www.northlakecollege.edu/resources/disability.html

DROP POLICY
DO NOT DROP UNTIL YOU SPEAK WITH YOUR INSTRUCTOR.
If you are unable to complete this course, you must officially withdraw by April 12, 2012.
Withdrawing is a formal procedure which you must initiate; your instructor cannot do it for you.

FINANCIAL AID STATEMENT
Students who are receiving any form of financial aid should check with the Financial Aid Office
prior to withdrawing from classes. Withdrawals may affect your eligibility to receive further aid
and could cause you to be in a position of repayment for the current semester. Students who fail
to attend or participate are also subject to this policy.

To apply for financial aid in the DCCCD, students must complete FAFSA (Free Application for

COUNSELING SERVICES
Counseling services for personal issues are provided to all students currently enrolled at North
Lake College. These services are provided by licensed professionals who are bound by
confidentiality (within ethical parameters) at no charge. With the assistance of a counselor,
students are able to identify, understand, resolve issues and develop appropriate skills. To make
an appointment call 972-273-3333 or visit A 311.
STOP BEFORE YOU DROP
DO NOT DROP UNTIL YOU SPEAK WITH YOUR INSTRUCTOR.
For students who enrolled in college level courses for the first time in the fall of 2007, Texas Education Code 51.907 limits the number of courses a student may drop.

You may drop no more than 6 courses during your entire undergraduate career unless the drop qualifies as an exception. Your campus counseling/advising center will give you more information on the allowable exceptions. Remember that once you have accumulated 6 non-exempt drops, you cannot drop any other courses with a “W”. Therefore, please exercise caution when dropping courses in any Texas public institution of higher learning, including all seven of the Dallas County Community Colleges. For more information, you may access: https://www1.dcccd.edu/coursedrops

The Academic Skills Center (ASC)
The ASC is designed to provide assistance to students in the following areas:
   • Labs for students enrolled in foreign language, Developmental Reading, and ESOL courses. One-on-one tutoring is available.
   • The Writing Center can help students clarify writing tasks, understand instructors’ requirements, develop and organize papers, explore revision options, detect grammar and punctuation errors, and properly use and document sources. Rather than merely editing or "fixing" papers, tutors focus on helping students develop and improve their writing skills.
   • The Online Writing Lab (OWL) allows students to submit papers to our writing tutors electronically and get feedback within 24-72 hours. The OWL can be accessed through eCampus. After logging on to eCampus, click on the Community Tab at the top. Type “Owl” in the search field and click “Go.” Next, click on the double drop-down arrows next to “NLC-OWL2,” and then click on “Enroll.” Once enrolled, students can receive services from the OWL.

For more information or to schedule a tutoring appointment, come by A-332 or call 972-273-3089.

General Education Outcomes
North Lake College has comprehensive general education outcomes and assures its graduates are able to meet those outcomes. Our graduates will acquire or improve skills that enable them to be productive citizens, lifelong learners, and effective employees. These skills include oral and written communication, critical/logical thinking, information literacy and technological competence, ethical and civic values, cultural diversity and global awareness, and workforce and interpersonal skills.

Outcome 1: Communication Skills
Outcome 2: Critical Thinking Skills
Outcome 3: Information Literacy and Technological Competency
Outcome 4: Ethical and Civic Values
Outcome 5: Cultural Diversity and Global Awareness
Outcome 6: Workforce and Interpersonal Skills

Exemplary Educational Objectives
All core mathematic courses must include a majority (greater than or equal to four) of the seven Exemplary Educational Objectives (EEO) listed below.

1. To apply arithmetic, algebraic, geometric, higher-order thinking, and statistical methods to modeling and solving real-world situations.
2. To represent and evaluate basic mathematical information verbally, numerically, graphically, and symbolically.
3. To expand mathematical reasoning skills and formal logic to develop convincing mathematical arguments.
4. To use appropriate technology to enhance mathematical thinking and understanding and to solve mathematical problems and judge the reasonableness of the results.
5. To interpret mathematical models such as formulas, graphs, tables and schematics, and draw inferences from them.
6. To recognize the limitations of mathematical and statistical models.
7. To develop the view that mathematics is an evolving discipline, interrelated with human culture, and understanding its connections to other disciplines.

http://www.dcccd.edu/Employees/Departments/EA/Academic+Programs/Core+Curriculum/Faculty+Resources/

Core Curriculum Intellectual Competencies
This course reinforces one of the 6 Core Curriculum Intellectual Competencies defined by the Texas Higher Education Coordinating Board. The CCIC identified by the DCCCD which is reinforced by College Algebra is as follows:

CRITICAL THINKING: Critical thinking embraces methods of applying both qualitative and quantitative skills analytically and creatively to subject matter in order to evaluate arguments and to construct alternative strategies.

Learning Activities, Outcomes, and Assessment

1. Learning Activity: Finding the Domain of a Square Root Function - Required
   a. Learning Outcomes: The student will relate inequalities to the domain of a square root function.

   Students will work in groups of two. Each group will turn in only one project. Each student must participate. Groups may work in the classroom (time permitting), but they may require additional time outside the classroom to complete the project.

   b. Assessment: This project is graded on neatness, accuracy and completeness. Each student will also take a quiz covering the project’s concepts. The quiz will be assigned in MyLabsPlus.

   c. EEO’s and CCIC’s: EEO’s 1, 5, 7; CCIC: Critical Thinking Gen Ed SLOs 1.1, 2.1, 2.2

2. Learning Activity: Finding the Equation of a Circle - Required
   a. Learning Outcomes: The student will use the geometric concepts from the distance formula and the midpoint formula to derive the equation of a circle when given two points.
b. **Assessment:** The project will be assessed based on neatness, accuracy, completeness and precision. Each student will also take a quiz covering the project’s concepts. The quiz will be assigned in MyLabsPlus.

c. **EEO’s and CCIC’s:** EEO’s 2, 3 and 5: CCIC Critical thinking Gen Ed SLOs 1.1, 2.1, 2.2

### 3. Learning Activity: Calculating Maximum Revenue - Required

a. **Learning Outcomes:** Students will calculate the maximum revenue by interpreting data from a given graph. Students will work in groups of two. Each group will turn in only one project. Each student must participate. Groups may work in the classroom (time permitting), but they may require additional time outside the classroom to complete the project.

b. **Assessment:** This project is graded on neatness, accuracy and completeness. Each student will also take a quiz covering the project’s concepts. The quiz will be assigned in MyLabsPlus.

c. **EEO’s and CCIC’s:** EEO’s 2, 3, 7; CCIC: Critical Thinking Gen Ed SLOs 1.1, 2.1, 2.2

### 4. Learning Activity: Visualizing the Graph - Required

a. **Learning Outcomes:** Using the leading-term test, the degree of a polynomial function and a knowledge of y-intercepts, students will match a function with its graph.

b. **Assessment:** The project will be assessed based on accuracy and completeness. Each student will also take a quiz covering the project’s concepts. The quiz will be assigned in MyLabsPlus.

c. **EEO’s and CCIC’s:** EEO’s 1, 3, 4, 5, 6, and 7: CCIC Critical thinking Gen Ed SLOs 1.1, 2.1, 2.2

### 5. Learning Activity: Curve Fitting - Optional

a. **Learning Outcomes:** The student will use mathematical modeling to evaluate present circumstances and predict the future.

b. **Assessment:** The project will be assessed based on neatness, accuracy, completeness and precision.

c. **EEO’s and CCIC’s:** EEO’s 1, 3, 4, 5, 6, and 7: CCIC Critical thinking Gen Ed SLOs 1.1, 2.1, 2.2

### 6. Learning Activity: Water Bill Project - Optional

a. **Learning Outcomes:** Students will use mathematical modeling to determine the pricing plan for a local water utility.

b. **Assessment:** The project will be assessed based on neatness, accuracy, completeness and precision.

c. **EEO’s and CCIC’s:** EEO’s 2, 5, and 7: CCIC Critical thinking Gen Ed SLOs 1.1, 2.1, 2.2

### 7. Learning Activity: Composite Functions - Optional

a. **Learning Outcomes:** The student will use the graphs of various functions to find the composition of functions.

b. **Assessment:** The project will be assessed based on neatness, accuracy, completeness and precision.

c. **EEO’s and CCIC’s:** EEO’s 2, 3, and 5: CCIC Critical thinking Gen Ed SLOs 1.1, 2.1, 2.2
# APPENDIX

## MATH 1414 Weekly Course Calendar

### Lecture – Spring 2012

<table>
<thead>
<tr>
<th>Date</th>
<th>Events</th>
</tr>
</thead>
<tbody>
<tr>
<td>January 17, 2011</td>
<td>Classes Begin</td>
</tr>
<tr>
<td>January 30, 2011</td>
<td>Certification Data</td>
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<tr>
<td>March 1-2, 2011</td>
<td>Employee Development Day ~ No Classes</td>
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<tr>
<td>March 12-16, 2011</td>
<td>Spring Break ~ No Classes</td>
</tr>
<tr>
<td>April 6-8, 2011</td>
<td>Holiday ~ No Classes</td>
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<tr>
<td>April 12, 2011</td>
<td>Drop date ~ Last day to drop with grade of W</td>
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<tr>
<td>April 30, 2011</td>
<td>Only one written test allowed after this date</td>
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<tr>
<td>May 7-10, 2011</td>
<td>Final Exams Only</td>
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### Week 1 (1-15-12)
- Orientation, Syllabus (online orientation in eCampus)
- Section 1.1 – Introduction to Graphing
- Section 1.2 – Functions and Graphs

### Week 2 (1-22-12)
- **SLO Activity 1 & 2 – located in eCampus Lesson Unit 1**
  - Section 1.3 – Linear Functions, Slope, and Applications – power point for Average Rate of Change (eCampus-Lesson Unit 1)
  - Section 1.4 – Equations of Lines and Modeling
  - Calculator tips (eCampus-Lesson Unit 1)
  - Section 1.5 – Linear Equations, Functions, Zeros, and Applications

### Week 3 (1-29-12)
- Section 1.6 – Solving Linear Inequalities
- AND/OR ppt (eCampus-Lesson Unit 1)
- Curve Fitting Project – Part I (optional – extra credit – eCampus-Lesson Unit 1)
- Review Chapter 1
- **SLO Quiz 1 and 2 (MLP)**
- Mastery Test 1 – Written **Test 1** in Testing Center
- Section 2.1 – Increasing, Decreasing, and Piecewise Functions; Applications
- Water Bill Project (optional – eCampus-Lesson Unit 1)

### Week 4 (2-5-12)
- Section 2.2 – The Algebra of Functions
- Section 2.3 – The Composition of Functions
- Section 2.4 – Symmetry and Transformations

### Week 5 (2-12-12)
- Section 2.5 – Variation and Applications
- Review Chapter 2
<table>
<thead>
<tr>
<th>Week</th>
<th>Dates</th>
<th>Content</th>
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<tbody>
<tr>
<td>6</td>
<td>2-19-12</td>
<td>Mastery Test 2 – Written Test 2 in Testing Center</td>
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<tr>
<td></td>
<td></td>
<td>Section 3.1 – The Complex Numbers</td>
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<td>Section 3.2 – Quadratic Equations, Functions, Zeros, and Models</td>
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<td>Section 3.3 – Analyzing Graphs of Quadratic Functions</td>
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<td><strong>SLO Activity 3 (eCampus – Lesson Unit 3)</strong></td>
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<td>Section 3.4 – Solving Rational Equations and Radical Equations</td>
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<td>7</td>
<td>2-26-12</td>
<td>Section 3.5 – Solving Equations and Inequalities with Absolute Value</td>
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<td>Review Chapter 3</td>
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<td><strong>SLO Quiz 3 (MLP)</strong></td>
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<td>Mastery Test 3 – Written Test 3 in Testing Center</td>
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<td></td>
<td>Section 4.1 – Polynomial Functions and Models</td>
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<td>8</td>
<td>3-4-12</td>
<td><strong>Written Midterm Test</strong> (Covers Chapter 1, 2, &amp; 3) in Testing Center – optional – see syllabus for your instructor’s policy</td>
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<td>Section 4.2 – Graphing Polynomial Functions</td>
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<td><strong>SLO Activity 4 (eCampus – Lesson Unit 4)</strong></td>
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<td>Section 4.3 – Polynomial Division; The Remainder and The Factor Theorem</td>
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<td>Section 4.4 – Theorems of Zeros of Polynomial Functions</td>
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<td>3-11-12</td>
<td>Spring Break</td>
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<td>9</td>
<td>3-18-12</td>
<td>Section 4.5 – Rational Functions</td>
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<td>Section 4.6 – Polynomial Inequalities and Rational Inequalities</td>
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<td>Review Chapter 4</td>
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<td>Mastery Test 4 – Written Test 4 in Testing Center</td>
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<td><strong>SLO Quiz 4 (MLP)</strong></td>
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<tr>
<td>10</td>
<td>3-25-12</td>
<td>Section 5.1 – Inverse Functions</td>
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<td>Section 5.2 – Exponential Functions and Graphs</td>
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<td>Section 5.3 – Logarithmic Functions and Graphs</td>
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<td>Section 5.4 – Properties of Logarithmic Functions</td>
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<td>11</td>
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<td>Section 5.5 – Solving Exponential Functions and Graphs</td>
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<td>Section 5.6 – Applications and Models: Growth and Decay; Compound Interest</td>
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<td>12</td>
<td>4-08-12</td>
<td>Review Chapter 5</td>
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<td>April 12 – Last Day to Withdraw</td>
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<td>Mastery Test 5 – Written Test 5 in Testing Center</td>
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<td>Curve Fitting Project – Part II (optional – extra credit)</td>
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<td></td>
<td></td>
<td>Section 6.1 – System of Equations in Two Variables (Pre-requisite material)</td>
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<td></td>
<td>Section 6.2 – System of Equations in Three Variables</td>
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<td></td>
<td></td>
<td>Calculator handout using rref to solve systems – Lesson Unit 6.</td>
</tr>
</tbody>
</table>
List of Course Objectives

Note: Pre-reqs should be reviewed by students as needed – concepts will not be covered in detail in this course.

Chapter 1: Graphs, Functions, and Models

Section 1.1: Introduction to Graphing
- Plot points…. OMIT (Pre-req)
- Determine whether an ordered pair is a solution of an equation…. OMIT (Pre-req)
- Find x- and y-intercepts of an equation…. OMIT (Pre-req)
- Graph equations
  Only linear equations are graphed at this point.
  Quadratic equations will be graphed later.
  - Find the distance between two points in the plane
  - Find the midpoint of a segment
  - Find an equation of a circle with a given center and radius
  - Given an equation of a circle in standard form, find the center and the radius
- Graph equations of circles: SLO 1 Activity

Section 1.2: Functions and Graphs
- Determine whether a correspondence or a relation is a function
- Find function values, or outputs, using a formula or a graph
- Graph functions
- Determine whether a graph is that of a function
- Find the domain and the range of a function: SLO 2 Activity
  Focus on linear, absolute value, quadratic, square root, cube root, and rational.
- Solve applied problems using functions

Section 1.3: Linear functions, Slope, and Applications
- Determine the slope of a line given two points on the line…. OMIT (Pre-req)
- Solve applied problems involving slope, or average rate of change - See Powerpoint
supplement located in eCampus: Lesson Unit 1
- Find the slope and the y-intercept of a line given the equation \( y = mx + b \) or \( f(x) = mx + b \)
- Graph a linear equation using the slope and the y-intercept
- Solve applied problems involving linear functions

**Section 1.4: Equations of Lines and Modeling**
- Determine equations of lines
- Given the equations of two lines, determine whether their graphs are parallel or perpendicular
- Model a set of data with a linear function

**Section 1.5: Linear Equations, Functions, Zeros, and Applications**
- Solve linear equations
- Solve applied problems using linear models
- Find zeros of linear functions

**Section 1.6: Solving Linear Inequalities**
- Solve linear inequalities
- Solve compound inequalities. **Review AND / OR** Powerpoint supplement - eCampus
- Solve applied problems using inequalities

**Curve Fitting Project** – Students should complete part I – see instructor for directions

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**Chapter 2: More on Functions**

**Section 2.1: Increasing, Decreasing, and Piecewise Functions; Applications**
- Graph functions, looking for intervals on which the function is increasing, decreasing, or constant, and estimate relative maxima and minima
- Given an application, find a function that models the application.
- Find the domain of the function and function values
- Graph functions defined piecewise
- Learning Activity: Water Bill Project - optional

**Section 2.2: The Algebra of Functions**
- Find the sum, the difference, the product, and the quotient of two functions, and determine the domains of the resulting functions
- Find the difference quotient for a function
  **Focus on linear and quadratic functions**

**Section 2.3: The Composition of Functions**
- Find the composition of two functions and the domain of the composition
- Decompose a function as a composition of two functions - optional

**Section 2.4: Symmetry and Transformations**
- Determine whether a graph is symmetric with respect to the x-axis, y-axis, and the origin
  **Determine symmetry using visual and algebraic tests. See Powerpoint supplement for algebraic test for symmetry** – eCampus.
- Determine whether a function is even, odd, or neither even nor odd
- Given the graph of a function, graph its transformation under translations, reflections, stretching, and shrinking

**Section 2.5: Variation and Applications**
- Find equations of direct variation, inverse variation, and combined variation given values of the variables
- Solve applied problems involving variation
<table>
<thead>
<tr>
<th>Chapter 3: Quadratic Functions and Equations; Inequalities</th>
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</thead>
<tbody>
<tr>
<td><strong>Section 3.1: The Complex Numbers</strong></td>
</tr>
<tr>
<td>• Perform computations involving complex numbers</td>
</tr>
<tr>
<td><strong>Powers of ( i ) greater than the fourth power will be covered in Trigonometry and PreCalculus.</strong></td>
</tr>
<tr>
<td><strong>Section 3.2: Quadratic Equations, Functions, Zeros, and Models</strong></td>
</tr>
<tr>
<td>• Find zeros of quadratic functions and solve quadratic equations by using the principle of zero products, by using the principle of square roots, by completing the square, and by using the quadratic formula</td>
</tr>
<tr>
<td>• Solve applied problems using quadratic equations</td>
</tr>
<tr>
<td><strong>Section 3.3: Analyzing Graphs of Quadratic Functions</strong></td>
</tr>
<tr>
<td>• Find the vertex, the axis of symmetry, and the maximum or minimum value of a quadratic function using the method of completing the square</td>
</tr>
<tr>
<td>• Graph quadratic functions</td>
</tr>
<tr>
<td>• Solve applied problems involving maximum and minimum function values: <strong>SLO 3 Activity</strong></td>
</tr>
<tr>
<td><strong>Activity for Discussion in Class:</strong> “Visualizing the Graph” on page 266. Emphasize the shape of the graph can be determined by analyzing the equation. <strong>SLO 4 activity</strong></td>
</tr>
<tr>
<td><strong>Section 3.4: Solving Rational Equations and Radical Equations</strong></td>
</tr>
<tr>
<td>• Solve rational equations</td>
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<tr>
<td>• Solve radical equations</td>
</tr>
<tr>
<td><strong>Section 3.5: Solving Equations and Inequalities with Absolute Value</strong></td>
</tr>
<tr>
<td>• Solve equations with absolute value</td>
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<tr>
<td>• Solve inequalities with absolute value</td>
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<thead>
<tr>
<th>Chapter 4: Polynomial Functions and Rational Functions</th>
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<tbody>
<tr>
<td><strong>Section 4.1: Polynomial Functions and Models</strong></td>
</tr>
<tr>
<td>• Determine the behavior of the graph of a polynomial function using the leading-term test</td>
</tr>
<tr>
<td>• Factor polynomial functions and find their zeros and their multiplicities</td>
</tr>
<tr>
<td>• Solve applied problems using polynomial models</td>
</tr>
<tr>
<td><strong>Section 4.2: Graphing Polynomial Functions</strong></td>
</tr>
<tr>
<td>• Graph polynomial functions</td>
</tr>
<tr>
<td>• Use the Intermediate Value Theorem to determine whether a function has a real zero between two given real numbers</td>
</tr>
<tr>
<td><strong>Section 4.3: Polynomial Division; The Remainder Theorem and the Factor Theorem</strong></td>
</tr>
<tr>
<td>• Perform long division with polynomials and determine whether one polynomial is a factor of another</td>
</tr>
<tr>
<td>• Use synthetic division to divide a polynomial by ( x-c )</td>
</tr>
<tr>
<td>• Use the Remainder Theorem to find a function value ( f(c) )</td>
</tr>
<tr>
<td>• Use the Factor Theorem to determine whether ( x-c ) is a factor of ( f(x) )</td>
</tr>
<tr>
<td><strong>See “Connecting the Concepts” on page 325.</strong></td>
</tr>
<tr>
<td><strong>Section 4.4: Theorems about Zeros of Polynomial Functions</strong></td>
</tr>
<tr>
<td><strong>NOTE:</strong> These objectives will be covered in detail in PreCalculus.</td>
</tr>
<tr>
<td>• Find a polynomial with specified zeros</td>
</tr>
<tr>
<td>• For a polynomial function with integer coefficients, find the rational zeros and the other zeros, if possible</td>
</tr>
<tr>
<td>• Use Descartes’ rule of signs to find information about the number of real zeros of a polynomial function with real coefficients - optional</td>
</tr>
<tr>
<td><strong>Section 4.5: Rational Functions</strong></td>
</tr>
<tr>
<td>• For a rational function, find the domain and graph the function, identifying all of the</td>
</tr>
</tbody>
</table>
asymptotes

- Solve applied problems involving rational functions

### Section 4.6: Polynomial Inequalities and Rational Inequalities

- Solve polynomial inequalities
- Solve rational inequalities

Know both the algebraic approach and visual (graphical) approach. Algebraic approach required on test.

### Chapter 5: Exponential Functions and Logarithmic Functions

#### Section 5.1: Inverse Functions

- Determine whether a function is one-to-one, and if it is, find a formula for its inverse
- Simplify expressions of the type \((f \circ f^{-1})(x)\) and \((f^{-1} \circ f)(x)\)

#### Section 5.2: Exponential Functions and Graphs

- Graph exponential equations and exponential functions
- Solve applied problems involving exponential functions and their graphs

#### Section 5.3: Logarithmic Functions and Graphs

- Find common logarithms and natural logarithms with and without a calculator
- Convert between exponential equations and logarithmic equations
- Change logarithmic bases
- Graph logarithmic functions
- Solve applied problems involving logarithmic functions

#### Section 5.4: Properties of Logarithmic Functions

- Convert from logarithms of products, powers, and quotients to expressions in terms of individual logarithms, and conversely
- Simplify expressions of the type \(\log_b a^x\) and \(a^{\log_b x}\)

#### Section 5.5: Solving Exponential Equations and Logarithmic Equations

- Solve exponential equations
- Solve logarithmic equations

#### Section 5.6: Applications and Models: Growth and Decay; Compound Interest

- Solve applied problems involving exponential growth and decay
- Solve applied problems involving compound interest

### Chapter 6: Systems of Equations and Matrices

#### Section 6.1: Systems of Equations in Two Variables

- OMIT (Pre-req)

#### Section 6.2: Systems of Equations in Three Variables

- Solve systems of linear equations in three variables (Pre-req – limited review)
- Use systems of three equations to solve applied problems

Focus is on setting up the system of equations. Students will solve these problems using technology and matrices in section 6.3. Calculator steps posted in eCampus.
- Model a situation using a quadratic function

#### Section 6.3: Matrices and Systems of Equations

- Solve systems of equations using matrices – focus on using technology to solve; rref – steps posted in eCampus

#### Section 6.4: Matrix Operations

- OMIT

#### Section 6.5: Inverses of Matrices

- OMIT
<table>
<thead>
<tr>
<th>Section 6.6: Determinants and Cramer’s Rule</th>
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<tbody>
<tr>
<td>● Evaluate determinants of square matrices</td>
</tr>
<tr>
<td><strong>Focus on 2x2</strong></td>
</tr>
<tr>
<td>● Use Cramer’s rule to solve systems of equations - optional</td>
</tr>
<tr>
<td><strong>Section 6.7: Systems of Inequalities and Linear Programming</strong></td>
</tr>
<tr>
<td>● Graph linear inequalities</td>
</tr>
<tr>
<td>● Graph systems of linear inequalities</td>
</tr>
<tr>
<td>● Solve linear programming problems</td>
</tr>
<tr>
<td><strong>Section 6.8: Partial Fractions….OMIT</strong></td>
</tr>
</tbody>
</table>

**Chapter 8: Sequences, Series, and Combinatorics**

**Section 8.1: Sequences and Series**

● Find terms of sequences given the nth term  
● Look for a pattern in a sequence and try to determine a general term…OMIT  
● Convert between sigma notation and other notation for a series  
● Construct the terms of a recursively defined sequence

**Section 8.2: Arithmetic Sequences and Series**

● For any arithmetic sequence, find the nth term when n is given and n when the nth term is given; and given two terms find the common difference and construct the sequence  
● Find the sum of the first n terms of an arithmetic sequence

**Section 8.3: Geometric Sequences and Series**

● Identify the common ratio of a geometric sequence, and find a given term and the sum of the first n terms  
● Find the sum of an infinite geometric series, if it exists

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**Student Guidelines for Written Assignments**

Writing mathematics is a lot like writing a composition paper. There is an introduction (the problem), body (work/steps), and a conclusion (the answer). Your work must flow in a clear, precise and logical order. You must use the proper notation and use the properties, theorems, and rules correctly.

Listed below are the expectations and guidelines for every assignment. Your grade will be based upon how well you follow these guidelines. The goal of these guidelines is to help you become a better thinker and presenter which will be beneficial for any career you choose.

**Expectations for all written assignments:**

1. If you use a spiral notebook and tear out the pages, you need to trim off the “shards” before turning in the assignment. Loose-leaf paper is preferred.

2. Your name, course number, and chapter and section from the text (if applicable) should be written in the upper right-hand corner of the first page. Each assignment should be stapled in the upper left-hand corner of the page.

3. The problem number or name of the assignment should be written down for each problem assigned. Next include a summary of the problem and directions. Be sure to include all the given information in your summary and a picture of the problem if necessary.
4. If the problem requires you to introduce variables in order to solve it, you must clearly define the variables. Variables must represent **numerical** quantities, not objects. Be sure to include the units of the variables (for example, feet, pounds, minutes, etc).

5. For word problems you will need to set up the equation(s) that model(s) the problem using the defined variables.

6. Write the steps of the problem down the left-hand side of the paper with each step directly under the previous one. Show **every step**. Don’t skip a step even if you may think it is easy. The steps should be clear and follow a logical order. If numeric computations are necessary, do them neatly on the right-hand side of the paper.

7. Make sure that every statement you write is a true statement and uses the correct notation.

8. Check your answer to make sure it is reasonable/correct with respect to the problem.

9. State your final answer using a complete sentence and include the correct unit of measure (i.e. inches, feet, minutes, square feet, etc).

10. Skip at least 1 line between each problem.

For detailed examples of required work, see “Guidelines for All Tests and Assignments” document posted in your eCampus classroom.

Go to the eCampus classroom for the following documents:
1) Guidelines for Homework Assignments and All Tests and
2) Chapter Summary