I. INTRODUCTION

Developmental Mathematics II is designed for students who need a review of fundamental algebraic operations. The course supports students in developing skills, strategies, and reasoning needed to succeed in mathematics, including communication and appropriate use of technology. Topics include the study of numeracy and the real number system; algebraic concepts, notation, and reasoning; quantitative relationships; mathematical models; and problem solving. Additional topics include: linear equations, weight, mass, capacity, system of linear equations, and polynomials. This course will assist the student in developing the critical-thinking and problem-solving skills necessary for other developmental or college-level courses.

This course is required for students who have not achieved a passing score on the TSI Assessment. Successful completion of this course fulfills the prerequisite for the next higher developmental or college-level mathematics course. The prerequisite for this course is DSMA 0400 or an appropriate placement test score.

II. LEARNING OUTCOMES

Upon successful completion of this course, Developmental Mathematics II, the student will be able to:

A. Use appropriate symbolic notation and vocabulary to communicate, interpret, and explain mathematical concepts. (F1, F2, F5, F10)
B. Define, represent, and perform operations on real numbers, applying numeric reasoning to investigate and describe quantitative relationships and solve real world problems in a variety of contexts. (F1, F2, F3, F4, F6, F8, F9)
C. Use algebraic reasoning to solve problems that require ratios, rates, percentages, and proportions in a variety of contexts using multiple representations. (F2, F4, F8, F9)
D. Apply algebraic reasoning to manipulate expressions and equations to solve real world problems. (F3, F4, F8, F9)
E. Use graphs, tables, and technology to analyze, interpret, and compare data sets. (F2, F3, F5, F8, F10)
F. Construct and use mathematical models in verbal, algebraic, graphical, and tabular form to solve problems from a variety of contexts and to make predictions and decisions. (F2, F3, F4, F5, F6, F8, F9, F10)

G. Solve and graph linear equations and inequalities. (F1, F3, F4, F5, F8, F9, F10, F12)

H. Demonstrate ability to add subtract, multiply, and divide polynomials. (F1, F3, F4, F5, F8, F9, F10, F12)

I. Solve systems of linear equations by graphing, substitution and addition (F1, F3, F4, F5, F8, F9, F10, F12)

J. Analyze and solve problem that pertain to, but not limited to angles, distance, perimeter, area, volume, surface area, and probability. (F1, F3, F4, F5, F8)

K. Compute basic operations on and convert units of measurement. (F1, F3, F4, F5, F8)

L. Use electronic and other media, such as the computer and DVD, to reinforce and supplement the learning process. (F1, F2, F3, F6)

M. Demonstrate critical thinking, communication, and empirical and quantitative skills. (F1, F3, F4, F7, F9)

Some learning outcomes are followed by letters and numbers; i.e., C9 or F11. These refer to SCANS foundations skills (F) and workplace competencies (C). View a chart showing these skills at http://www.ctcd.edu/scans. For more on the (Labor) Secretary's Commission on Achieving Necessary Skills, or SCANS, go to the U.S. Department of Labor site at http://wdr.doleta.gov/SCANS/.

III. INSTRUCTIONAL MATERIALS/RESOURCES

To assist in this course, a variety of materials both in and out of the classroom will be required and used. The instructional materials identified for this course are viewable through:

www.ctcd.edu/books

***Required: Set of earphones for personal use in lab.***

Students will be allowed to use the basic calculator: Casio fx-55 PLUS

IV. COURSE REQUIREMENTS

A. Assignments are given in My Labs (MML) and are due as scheduled by your instructor. The instructor will monitor students’ progress in completing the assignments.

B. Every student must complete a minimum of 16 hours in the Developmental Studies computer lab before the final deadline. Students will be given three deadlines throughout the term to monitor progression of the lab hour requirement.
All 16 hours MUST BE COMPLETED by the final deadline. If a student fails to complete all 16 hours by the final deadline, he or she will receive a grade of zero (0) on the final examination.

V. EXAMINATIONS AND ASSIGNMENTS

CHALLENGE EXAMS

Mathematics students may be eligible, during the first week of the semester, to challenge the classes in which they are enrolled. Students must discuss the challenge procedures with their instructors to determine eligibility. If eligible to take the exam, a student will receive a signed challenge exam request form from the instructor. The challenge exam must be taken during the first week of classes.

A. Periodic examinations will be given during the course in order to evaluate a student’s progress. A comprehensive final will be given.

Failure to take the final examination for the course will result in a grade of zero (0) to be posted for that examination. Students may not "retake" any exam. No "early" finals, take-home or open-book examinations will be administered. No examination grades will be dropped.

B. If you miss an exam, and have an excused absence, your instructor will arrange a make-up at his/her discretion. Said make-up may involve counting the next exam as a 200 point exam.

If you miss an exam, and do not have an excused absence then a make-up exam will be granted only at the discretion of the instructor. The make-up exam, if granted, will be given by appointment only.

C. If the student is absent from class, it is his or her responsibility to contact his or her classmate/instructor to determine missed instruction. Each student must make appropriate arrangements to acquire missed instruction. Each student must make appropriate arrangements to acquire assignments, announcements, lecture notes, and other pertinent information missed. Material on each class topic is available on CD and/or on the computer software in the lab. Students should use these resources to catch up on any missed lectures.

D. Class exams will be returned to students within three class periods after the exam is administered.

E. The instructor may require students to use a Bluebook/Scantron for each examination. Bluebooks/Scantrons are available in the Campus Bookstore.
VI. SEMESTER GRADE COMPUTATION

To receive a passing grade of “A,” “B,” or “C” in this course, each student must complete 16 hours of required laboratory, complete all requirements and assignments, and earn a weighted average of 70% or above. The periodic/unit examinations will determine 15%, My Math Lab quizzes will determine 15%, My Math Lab Homework will determine 10%, Attendance/Participation will determine 10%, midterm examination will determine 20%, and the final examination will determine 30% of the final average.

Final grades will follow the grade designation for developmental courses below:

- “A” – Weighted average of 90 – 100%
- “B” - Weighted average of 80 – 89%
- “C” - Weighted average of 70 – 79%
- “D” – Weighted average of 60 – 69%
- “F” – Weighted average of 0 – 59%
- “W” - Withdrawal from course (initiated by student)

Students may receive their grades through:

The CTC WebAdvisor (Online) System, which has instructions for using the WebAdvisor (Online) Registration and Grades by computer listed in the schedule bulletin.

Grades will not be posted.

VII. NOTES AND ADDITIONAL INSTRUCTIONS FROM THE INSTRUCTOR

A. Withdrawal from Course: It is the student's responsibility to officially withdraw from a class if circumstances prevent attendance. Any student who desires to, or must, officially withdraw from a course after the first scheduled class meeting must file an Application for Withdrawal or Application for Refund. The withdrawal form must be signed by the student.

An Application for Withdrawal will be accepted at any time prior to Friday of the 12th week of classes during the 16-week fall and spring semesters. The deadline for sessions of other lengths is as follows:

- 12 week session: Friday of the 9th week
- 10 week session: Friday of the 7th week
- 8 week session: Friday of the 6th week
- 6 week session: Friday of the 4th week
- 5 week session: Friday of the 3rd week

The equivalent date (75% of the semester) will be used for sessions of other lengths. The specific last day to withdraw is published each semester in the schedule bulletin.
Students who officially withdraw will receive a "W" if their academic performance is satisfactory at the time of official withdrawal. Students must file a withdrawal application with the college before they may be considered for withdrawal.

Before withdrawing from any developmental course, the student should seek the advice of Guidance and Counseling so that the student does not initiate an action that would inadvertently have negative repercussions on his/her enrollment or Financial Aid.

B. **Cellular Phones and Pagers:** Cellular phones and pagers must be turned off and put away while the student is in the classroom or laboratory.

C. **American’s With Disabilities Act (ADA):** Disability Support Services provides services to students who have appropriate documentation of a disability. Students requiring accommodations for class are responsible for contacting the Office of Disability Support Services (DSS) located on the central campus. This service is available to all students, regardless of location. Review the website at [www.ctcd.edu/disability-support](http://www.ctcd.edu/disability-support) for further information. Reasonable accommodations will be given in accordance with the federal and state laws through the DSS office.

D. **Civility:** Individuals are expected to be cognizant of what a constructive educational experience is and respectful of those participating in a learning environment. Failure to do so can result in disciplinary action up to and including expulsion.

F. **Office Hours:** Full-time instructors post their office hours outside their office doors. Part-time instructors may be available by appointment. Please feel free to see your instructor should you find yourself having difficulty with this course.

**VIII. COURSE OUTLINE**

A. **Unit One: (Chapter Eight) Geometry and Measurement**

1. **Unit Objectives:** Upon successful completion of this unit the student will be able to do the following:
   a. Identify Lines, Line Segments, Rays, and Angles.
   b. Classify Angles as Acute, Right, Obtuse, or Straight
   c. Identify Complementary and Supplementary Angles
   d. Calculate Measures of Angles.
   e. Demonstrate ability to use Formulas to Find Perimeters.
   f. Demonstrate ability to use Formulas to Find Circumferences
   g. Calculate the Area of Plane Regions
   h. Calculate the Volume and Surface Area of Solids
   i. Define U.S. Units of Length and Convert from One Unit to Another.
   j. Demonstrate ability to use Mixed Units of Length
k. Apply knowledge of Arithmetic Operations on U.S. Units of Length
l. Define Metric Units of Length and Convert from One Unit to Another
m. Apply knowledge of Arithmetic Operations on Metric Units of Length
n. Define U.S. Units of Weight and Convert from One Unit to Another.
o. Apply knowledge of Arithmetic Operations on U.S. Units of Weight
p. Define Metric Units of Mass and Convert from One Unit to Another
q. Apply knowledge of Arithmetic Operations on Metric Units of Mass
r. Define U.S. Units of Capacity and Convert from One Unit to Another.
s. Apply knowledge of Arithmetic Operations on U.S. Units of Capacity
t. Define Metric Units of Capacity and Convert from One Unit to Another
u. Apply knowledge of Arithmetic Operations on Metric Units of Capacity
w. Convert Temperatures from Degrees Celsius to Degrees Fahrenheit
x. Convert Temperature from Degrees Fahrenheit to Degrees Celsius.

2. **Learning Activities:**
a. Classroom lecture/discussion
b. Reading/homework assignments
c. Computer Laboratory/Computer Tutor

3. **Unit Outline:**
a. Section 8.1 Line and Angles
b. Section 8.2 Perimeter
c. Section 8.3 Area, Volume, and Surface Area
d. Section 8.4 Linear Measurements
e. Section 8.5 Weight and Mass
f. Section 8.6 Capacity
g. Section 8.7 Temperature and Conversions between the U.S. and Metric Systems

B. **Unit Two: (Chapter Nine)**

1. **Unit Objectives:** Upon successful completion of this unit the student will be able to do the following:
   a. Define the Meaning of the Symbols $=, \neq, <, >, \leq, \text{ and } \geq$
   b. Translate Sentences into Mathematical Statements
   c. Identify Integers, Rational Numbers, Irrational Numbers, and Real Numbers
d. Demonstrate ability to use the Commutative and Associative Properties.
e. Demonstrate ability to use the Distributive Property
f. Demonstrate ability to use the Identity and Inverse Properties
g. Apply the General Strategy for Solving Linear Equations
h. Solve Equations Containing Fractions and Decimals.
i. Recognize Identities and Equations with No Solution
j. Solve Problems Involving Direct Translations
k. Solve Problems Involving Relationships Among Unknown Quantities.
l. Solve Problems Involving Consecutive Integers.
m. Demonstrate ability to use Formulas to Solve Problems
n. Solve a Formula or Equation for One of Its Variables
o. Define Linear Inequality in One Variable, Graph Solution Sets on a Number Line, and Use Interval Notation
p. Demonstrate ability to use the Addition Property of Inequality to Solve Inequalities
q. Demonstrate ability to use the Multiplication Property of Inequality to Solve Inequalities
r. Demonstrate ability to use Both Properties to Solve Inequalities
s. Solve Problems Modeled by Inequalities

2. Learning Activities:
a. Classroom lecture/discussion
b. Reading/homework assignments
c. Computer Laboratory/Computer Tutor

3. Unit Outline:
a. Section 9.1 Symbols and Sets of Numbers
b. Section 9.2 Properties of Real Numbers
c. Section 9.3 Further Solving Linear Equations
d. Section 9.4 Further Problem Solving
e. Section 9.5 Formulas and Problem Solving
f. Section 9.6 Linear Inequalities and Problem Solving

C. Unit Three: (Chapter Ten) Graphing
1. Unit Objectives: Upon successful completion of this unit the student will be able to do the following:
a. Interpret bar and line graphs
b. Define the rectangular coordinate system and plot ordered pairs of numbers
c. Construct a graph of paired data to create a scatter diagram
d. Formulate whether an ordered pair is a solution of an equation in two variables
e. Calculate the missing coordinate of an ordered pair solution, given one coordinate of the pair
f. Identify linear equations
g. Construct a graph of a linear equation by finding and plotting ordered pair solutions.

h. Identify intercepts of a graph

i. Construct a graph of a linear equation by finding and plotting intercepts

j. Identify and graph vertical and horizontal lines

k. Calculate the slope of a line given two points of the line

l. Identify the slope of a line given its equation

m. Identify the slopes of horizontal and vertical lines

n. Compare the slopes of parallel and perpendicular lines

o. Interpret slope as a rate change

p. Construct a graph of linear equations using the slope-intercept form.

q. Write an equation of a line using slope-intercept form.

r. Write an equation of a line using the point-slope form to find given its slope and a point on the line.

s. Write an equation of a line using the point-slope form to find given two points of the line.

t. Identify equations of vertical and horizontal lines

u. Solve problems using the point-slope form of a line.

v. Identify Relations, Domains, and Ranges.

w. Identify Functions

x. Examine a graph to determine if it is a function by using the Vertical Line Test

y. Illustrate knowledge of Function Notation

2. Learning Activities:
   a. Classroom lecture/discussion
   b. Reading/homework assignments
   c. Computer Laboratory/Computer Tutor

3. Unit Outline:
   a. Section 10.1 Reading Graphs and the Rectangular Coordinate System
   b. Section 10.2 Graphing Linear Equations
   c. Section 10.3 Intercepts
   d. Section 10.4 Slope and Rate of Change
   e. Section 10.5 Equations of Lines
   f. Section 10.6 Functions

D. Unit Four: (Chapter Eleven) **Solving Systems of Linear Equations**

1. Unit Objectives: Upon successful completion of this unit the student will be able to do the following:
   a. Classify an ordered pair as a solution of a system of equations in two variables
   b. Solve a system of linear equations by graphing
   c. Identify the number of solutions of a system, without graphing.
d. Solve a system of linear equations using the substitution method.
e. Solve a system of linear equations using the addition method.
f. Solve a system of three linear equations in three variables
g. Solve Problems That Can Be Modeled by a System or Two Linear Equations
h. Solve Problems with Cost and Revenue Functions
i. Solve Problems That Can Be Modeled by a System of Three Linear Equations.

2. Learning Activities:
   a. Classroom lecture/discussion
   b. Reading/homework assignments
   c. Computer Laboratory/Computer Tutor

3. Unit Outline:
   a. Section 11.1 Solving Systems of Linear Equations by Graphing
   b. Section 11.2 Solving Systems of Linear Equations by Substitution
   c. Section 11.3 Solving Systems of Linear Equations by Addition
   d. Section 11.4 Solving Systems of Linear Equations in Three Variables
   e. Section 11.5 Systems of Linear Equations and Problem Solving

E. Unit Five: (Chapter Twelve) Exponents and Polynomials
1. Unit Objectives: Upon successful completion of this unit the student will be able to do the following:
   a. Evaluate exponential expressions
   b. Apply knowledge to implement the product rule for exponents
   c. Apply knowledge to implement the power rule for exponents
   d. Apply knowledge to implement the power rules for products and quotients
   e. Apply knowledge to implement the quotient rule for exponents, and define a number raised to the 0 power
   f. Distinguish which rule(s) to use to simplify an expression
   g. Define polynomial, monomial, binomial, trinomial, and degree
   h. Define polynomial functions
   i. Apply knowledge to simplify a polynomial by combining like terms
   j. Demonstrate ability to add and subtract polynomials
   k. Demonstrate ability to multiply monomials
   l. Demonstrate ability to use the distributive property to multiply polynomials
   m. Demonstrate ability to multiply polynomials vertically
   n. Demonstrate ability to multiply two binomials using the FOIL method
   o. Demonstrate ability to square a binomial
   p. Demonstrate ability to multiply the sum and difference of two terms
   q. Differentiate if able to use special products to multiply binomials
r. Apply knowledge to simplify expressions containing negative exponents
s. Collect all the rules and definitions for exponents to simplify exponential expressions
t. Write numbers in scientific notation
u. Convert numbers from scientific notation to standard form
v. Calculate arithmetic operations on numbers written in scientific notation
w. Demonstrate ability to divide a polynomial by a monomial
x. Show understanding of the rules of long division to divide a polynomial by another polynomial
y. Apply knowledge of Synthetic Division to Divide a Polynomial by a Binomial
z. Apply knowledge of Remainder Theorem to Evaluate Polynomials

2. Learning Activities:
a. Classroom lecture/discussion
b. Reading/homework assignments
c. Computer Laboratory/Computer Tutor

3. Unit Outline:
a. Section 12.1 Exponents
b. Section 12.2 Adding and Subtracting Polynomials
c. Section 12.3 Multiplying Polynomials
d. Section 12.4 Special Products
e. Section 12.5 Negative Exponents and Scientific Notation
f. Section 12.6 Dividing Polynomials
g. Section 12.7 Synthetic Division and Remainder Theorem