CENTRAL TEXAS COLLEGE
SYLLABUS FOR MATH 1332
CONTEMPORARY MATHEMATICS
Semester Hours Credit: 3

I. INTRODUCTION

A. Contemporary Mathematics, Math 1332, is a three semester hour course which covers such topics to include sets, number theory, geometric concepts, consumer finance, and an introduction to probability and statistics.

B. This course is for non-mathematics, non-science, and non-business students seeking mathematics credit for an AAS degree.

C. In support of the objectives of the Texas core curriculum, the course provides significant exercise of students’ critical thinking, communication skills, empirical and quantitative skills, and teamwork. These objectives form a foundation of intellectual and practical skills that are essential for all learning.
   1. Critical thinking skills include creative thinking, innovation inquiry, and analysis, evaluation and synthesis of information
   2. Communication skills include effective development, interpretation and expression of ideas through written, oral and visual media.
   3. Empirical and quantitative skills include the ability to manipulate and analyze numerical data or observable facts to reach informed conclusions.

D. Prerequisites: DSMA 0301 or equivalent, or acceptable placement test score.

II. LEARNING OUTCOMES

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

A. Apply Set Notation, Diagram Sets. (F1, F3, F4)
B. Perform Set Operations. (F3)
C. Define and Identify Composite, Prime Numbers, and Subsets of the Real Numbers. (F1, F2, F3)
D. Perform problems involving Arithmetic and Geometric Sequences. (F1, F2, F4)
E. Solve Consumer Mathematics problems involving percent, interest, installment buying, home ownership and investments. (F1, F2, F4)
F. Define, identify, and be able to solve problems involving points, lines, planes, angles, triangles, polygons, perimeter, area, circumference, and volume. (F1, F2, F3, F4)
G. Solve problems using right triangle trigonometry. (F1, F2, F4, F6)
H. Find terms and sums of arithmetic, geometric, and infinite geometric sequences. (F1, F2, F3, F4)
I. Apply the Fundamental Counting Principle. (F1, F2, F3)
J. Compute Permutations and Combinations. (F1, F2, F3)
K. Apply the Fundamentals of Probability to solve problems. (F1, F2, F4, F6)
L. Solve statistical problems involving sampling, frequency distributions, measures of central tendency, measures of dispersion, the normal distribution, and correlations. (F1, F2, F4, 6)
M. Construct graphs, scatter plots, and regression lines. (F1, F2, F4, F6)
N. Use technology to reinforce and supplement the learning process. (F1, F2, C18, C19)
O. Demonstrate critical thinking, communication, and empirical and quantitative skills. (F1, F2, F7, F8, F9)

III. INSTRUCTIONAL MATERIALS

The Instructional materials identified for this course are viewable through www.ctcd.edu/books

IV. COURSE REQUIREMENTS

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

B. Students are expected to attend every class, to arrive at each class on time, and remain in class for the entire period. Students who are absent from class 12.5% of the number of class meetings for any reason will be dropped from the class with a grade of "F". Instructors may choose to lower a student's grade because of tardiness.

V. EXAMINATIONS

A. Examinations will be given at appropriate points during the semester. Each examination will be announced in class in advance. There will be three examinations (including the final).

B. Students who miss an exam should discuss with the instructor the circumstances surrounding the absence. The instructor will determine whether a make-up exam is to be given. It is necessary to make an appointment with the instructor for a make-up exam.

7/7/14
VI. SEMESTER GRADE COMPUTATIONS

A. The semester average is derived from the homework, quizzes, unit exams, and comprehensive final exam in MyMathLab in accordance with the weights below:

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
<td>10%</td>
</tr>
<tr>
<td>Quizzes</td>
<td>15%</td>
</tr>
<tr>
<td>Chapter Applications</td>
<td>5%</td>
</tr>
<tr>
<td>Unit 1 Exam</td>
<td>20%</td>
</tr>
<tr>
<td>Unit 2 Exam</td>
<td>20%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>30%</td>
</tr>
</tbody>
</table>

B. Final grades will follow the grade designation below:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Class Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;A&quot;</td>
<td>90 to 100</td>
</tr>
<tr>
<td>&quot;B&quot;</td>
<td>80 to 89</td>
</tr>
<tr>
<td>&quot;C&quot;</td>
<td>70 to 79</td>
</tr>
<tr>
<td>&quot;D&quot;</td>
<td>60 to 69</td>
</tr>
<tr>
<td>&quot;F&quot;</td>
<td>0 to 59</td>
</tr>
</tbody>
</table>

VII. NOTES AND ADDITIONAL INSTRUCTIONS

A. Withdrawal from Course: It is the student's responsibility to officially drop 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 an 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.

<table>
<thead>
<tr>
<th>Session</th>
<th>Deadline for Withdrawal</th>
</tr>
</thead>
<tbody>
<tr>
<td>12-week session</td>
<td>Friday of the 9th week</td>
</tr>
<tr>
<td>10-week session</td>
<td>Friday of the 7th week</td>
</tr>
<tr>
<td>8-week session</td>
<td>Friday of the 6th week</td>
</tr>
<tr>
<td>6-week session</td>
<td>Friday of the 4th week</td>
</tr>
<tr>
<td>5-week session</td>
<td>Friday of the 3rd week</td>
</tr>
</tbody>
</table>

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.

7/7/14
Students who officially withdraw will be awarded the grade of "W" provided the student's attendance and academic performance are satisfactory at the time of official withdrawal. Students must file a withdrawal application with the college before they may be considered for withdrawal.

A student may not withdraw from a class for which the instructor has previously issued the student a grade of "F" or "FN" for nonattendance.

B. **An Administrative Withdrawal:** An administrative withdrawal may be initiated when the student fails to meet College attendance requirements. The instructor will assign the appropriate grade on the Administrative Withdrawal Form for submission to the registrar.

C. **An Incomplete Grade:** The College catalog states, "An incomplete grade may be given in those cases where the student has completed the majority of the course work but, because of personal illness, death in the immediate family, or military orders, the student is unable to complete the requirements for a course..." Prior approval from the instructor is required before the grade of "I" is recorded. A student who merely fails to show for the final examination will receive a zero for the final and an "F" for the course.

D. **Cellular Phones and Beepers:** Cellular phones and beepers will be turned off while the student is in the classroom or laboratory.

E. **Americans With Disabilities Act (ADA):** Disability Support Services provide 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 for further information. Reasonable accommodations will be given in accordance with the federal and state laws through the DSS office.

F. **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.

G. **Math Lab:** The Math Department operates an Advanced Mathematics Lab in Building 152, Room 145. All courses offered by the Math Department are supported in the lab with appropriate tutorial software. Calculators and Graphlink are available for student use in the lab. Students are encouraged to take advantage of these opportunities. See posted hours for the Math Lab.
H. **Office Hours:** Full-time instructors post office hours in Blackboard. Part-time instructors may be available by appointment. If you have difficulty with the course work, please consult your instructor.

**VIII. COURSE OUTLINE**

A. **Unit One: Set Theory (Chapter 2)**

1. **Learning Outcomes:** Upon successful completion of this unit, the student will be able to:

   a. Use three methods to represent sets.
   b. Use the symbols $\in$ and $\notin$.
   c. Apply set notation to sets of natural numbers.
   d. Determine a set’s cardinal number.
   e. Recognize equal sets.
   f. Recognize equivalent sets.
   g. Distinguish between finite and infinite sets.
   h. Understand the meaning of a universal set.
   i. Understand the basic ideas of Venn Diagrams.
   j. Find the complement of a set.
   k. Use the symbols $\subseteq$, $\supseteq$, and $\subset$.
   l. Determine the number if subsets of a set.
   m. Apply concepts of subsets and equivalent sets to infinite sets.
   n. Use Venn diagrams to visualize set relationships.
   o. Perform operations with sets.
   p. Perform set operations with three sets.
   q. Use Venn diagrams with three sets
   r. Use Venn diagrams to illustrate equality of sets.
   s. Use Venn diagrams to visualize a survey’s results.
   t. Use the formula for $n(A \cup B)$.
   u. Use survey results to complete Venn diagrams and answer questions about the survey.

2. **Learning Activities:**

   a. Listen to classroom lecture and discuss exercises. (F5, F6, F7, F8)
   b. Read pages of assigned chapter. (F1)
   c. Work problems as assigned by the instructor. (F2, F7, F8, F9, F10, F11, F12)

3. **Unit Outline:**

7/7/14
B. **Unit Two:** Number Theory and Real Number System (Chapter 5)

1. **Unit Objectives:** Upon successful completion of this unit, the student will be able to:

   a. Determine divisibility.
   b. Write the prime factorization of a composite number.
   c. Find the greatest common divisor of two numbers.
   d. Solve problems using the greatest common divisor.
   e. Find the least common multiple of two numbers.
   f. Solve problems using the least common multiple.
   g. Define integers.
   h. Graph integers on a number line.
   i. Use symbols < and >.
   j. Find the absolute value of an integer.
   k. Perform operations with integers.
   l. Use the order of operations agreement.
   m. Define the rational numbers.
   n. Reduce rational numbers.
   o. Express rational numbers as decimals.
   p. Express decimals in form \( \frac{a}{b} \)
   q. Perform operations with rational numbers.
   r. Apply the density property of rational numbers.
   s. Solve problems involving rational numbers.
   t. Define irrational numbers.
   u. Simplify square roots.
   v. Perform operations with square roots.
   w. Rationalize the denominator.
   x. Recognize subsets of the real numbers.
   y. Recognize properties of real numbers.
   z. Apply properties of real numbers to clock addition.
   aa. Use properties of exponents.
   bb. Convert from scientific to decimal notation.
   cc. Convert form decimal to scientific notation.
   dd. Perform computations using scientific notation.
   ee. Solve applied problems using scientific notation.
ff. Write terms of an arithmetic sequence.

gg. Use the formula on the general term of an arithmetic sequence.

hh. Write terms of a geometric sequence.

ii. Use the formula for the general term of a geometric sequence.

2. **Learning Activities:**

   a. Listen to classroom lecture and discuss exercises. (F5, F6, F7, F8)
   b. Read pages of assigned chapter. (F1)
   c. Work problems as assigned by the instructor. (F2, F7, F8, F9, F10, F11, F12)

3. **Unit Outline:**

   a. Section 5.1 (Number Theory: Prime and Composite Numbers)
   b. Section 5.2 (The Integers; Order of Operations)
   c. Section 5.3 (The Rational Numbers)
   d. Section 5.4 (The Irrational Numbers)
   e. Section 5.5 (Real Numbers and Their Properties; Clock Addition)
   f. Section 5.6 (Exponents and Scientific Notation)
   g. Section 5.7 (Arithmetic and Geometric Sequences)

C. **Unit Three: Personal Finance (Chapter 8)**

1. **Unit Objectives:** Upon successful completion of this unit, the student will be able to:

   a. Express a fraction as a percent.
   b. Express a decimal as a percent.
   c. Express a percent as a decimal.
   d. Solve applied problems involving percent.
   e. Determine percent increase or decrease
   f. Investigate some of the ways percent can be abused.
   g. Determine gross income, adjustable gross income, and taxable income.
   h. Calculate federal income tax.
   i. Calculate FICA taxes.
   j. Solve problems involving working students and taxes.
   k. Calculate simple interest.
   l. Use the future value formula.
   m. Use compound interest formulas.
   n. Calculate present value.
   o. Understand and compute effective annual yield.

7/7/14
Compute the monthly payment and interest costs for a car loan.

Understand the types of leasing contracts.

Understand the pros and cons of leasing versus buying a car.

Understand the different kinds of car insurance.

Compare monthly payments on new and used cars.

Solve problems related to owning and operating a car.

Compute the monthly payment and interest costs for a mortgage.

Prepare a partial loan amortization schedule.

Solve problems involving what you can afford to spend for a mortgage.

Understand the pros and cons of renting versus buying.

Find the interest, balance due, and the minimum monthly payment for credit card loans.

Understand the pros and cons of using credit cards.

Understand the difference between credit cards and debit cards.

Know what is contained in a credit report.

Understand credit scores as measures of creditworthiness.

Learning Activities:

Listen to classroom lecture and discuss exercises. (F5, F6, F7, F8)

Read pages of assigned chapter. (F1)

Work problems as assigned by the instructor. (F2, F7, F8, F9, F10, F11, F12)

Unit Outline:

Section 8.1 (Percent, Sales Tax, and Discounts)

Section 8.2 (Income Tax)

Section 8.3 (Simple Interest)

Section 8.4 (Compound Interest)

Section 8.6 (Cars)

Section 8.7 (The Cost of Home Ownership)

Section 8.8 (Credit Cards)

Unit Four: Geometry (Chapter 10)
b. Solve problems involving angle measures.
c. Solve problems involving angles formed by parallel lines and transversals.
d. Solve problems involving angle relationships in triangles.
e. Solve problems using the Pythagorean Theorem.
f. Name certain polygons according to the number of sides.
g. Recognize the characteristics of certain quadrilaterals.
h. Solve problems involving a polygon’s perimeter.
i. Find the sum of the measures of a polygon’s angles.
j. Use area formulas to compute the areas of plane regions and solve applied problems.
k. Use formulas for a circle’s circumference and area.
l. Use volume formulas to compute the volumes of three-dimensional figures and solve applied problems.
m. Compute the surface area of three-dimensional figure.
n. Use the lengths of the sides of a right triangle to find the trigonometric ratios.
o. Use trigonometric ratios to find the missing parts of right triangles.
p. Use trigonometric ratios to solve applied problems.

2. **Learning Activities.**

a. Listen to classroom lecture and discuss exercises. (F5, F6, F7, F8)
b. Read pages of assigned chapter. (F1)
c. Work problems as assigned by instructor. (F2, F7, F8, F9, F10, F11, F12)

3. **Unit Outline:**

a. Section 10.1 (Points, Lines, Planes, and Angles)
b. Section 10.2 (Triangles)
c. Section 10.3 (Polygons, Perimeter, and Tessellations)
d. Section 10.4 (Area and Circumference)
e. Section 10.5 (Volume and Surface Area)
f. Section 10.6 (Right Triangle Trigonometry)

F. **Unit Five: Counting Methods and Probability Theory (Chapter 11)**

a. Use the Fundamental Counting Principle to determine the number of possible outcomes in a given situation.
b. Use the Fundamental Counting Principle to count permutations.
c. Evaluate factorial expressions.
d. Use the permutations formula.
e. Distinguish between permutation and combination problems.

7/7/14
f. Solve problems involving combinations using the combinations formula.
g. Compute theoretical probability
h. Compute empirical probability.
i. Compute probabilities with permutations.
j. Compute probabilities with combinations.
k. Find the probability that an event will not occur.
l. Find the probability of one event or a second event occurring.
m. Understand and use odds.
n. Find the probability of one event and a second event occurring.
o. Compute conditional probabilities.
p. Compute expected value.
q. Use expected value to solve applied problems.
r. Use expected value to determine the average payoff or loss in a game of chance.

2. **Learning Activities.**
   a. Listen to classroom lecture and discuss exercises. (F5, F6, F7, F8)
   b. Read pages of assigned chapter. (F1)
   c. Work problems as assigned by instructor. (F2, F7, F8, F9, F10, F11, F12)

3. **Unit Outline:**
   a. Section 11.1 (The Fundamental Counting Principle)
   b. Section 11.2 (Permutations)
   c. Section 11.3 (Combinations)
   d. Section 11.4 (Fundamental of Probability)
   e. Section 11.5 (Probability with the Fundamental Principle, Permutations and Combinations.)
   f. Section 11.6 (Events Involving Not and Or; Odds)
   g. Section 11.7 (Events Involving And; Conditional Probability)
   h. Section 11.8 (Expected Values)

G. **Unit Six: Statistics (Chapter 12)**

1. **Unit Objectives:** Upon successful completion of this unit, the student will be able to:
   a. Describe the population whose properties are to be analyzed.
   b. Select an appropriate sampling technique.
   c. Organize and present data.
   d. Identify deceptions in visual displays of data.
   e. Determine the mean for a data set.

7/7/14
f. Determine the median for a data set.
g. Determine the mode for a data set.
h. Determine the midrange for a data set.
i. Determine the range for a data set.
j. Determine the standard deviation for a data set.
k. Recognize characteristics if normal distributions.
l. Understand the 68-95-99.7 Rule.
m. Find scores at a specified standard deviation form the mean.
n. Use the 68-95-99.7 Rule.
o. Convert a data item to a $z$-score.
p. Understand and use percentiles.
q. Use and interpret margins of error.
r. Recognize distributions that are normal.
s. Make a scatter plot for a table of data items.
t. Interpret information given in a scatter plot.
u. Compute the correlation coefficient.
v. Write the equation of the regression line.
w. Use a sample’s correlation coefficient to determine whether there is a correlation in the population.

2. Learning Activities.

a. Listen to classroom lecture and discuss exercises. (F5, F6, F7, F8)
b. Read pages of assigned chapter. (F1)
c. Work problems as assigned by instructor. (F2, F7, F8, F9, F10, F11, F12)

3. Unit Outline:

a. Section 12.1 (Sampling, Frequency Distributions, and Graphs)
b. Section 12.2 (Measures of Central Tendency)
c. Section 12.3 (Measures of Dispersion)
d. Section 12.4 (The Normal Distribution)
e. Section 12.5 (Problem Solving with the Normal Distribution)
f. Section 12.6 (Scatter Plots, Correlation, and Regression Lines)