



**COWLEY COLLEGE  
& Area Vocational Technical School**

**COURSE PROCEDURE FOR**

**CONTEMPORARY MATHEMATICS  
MTH4419     3 Credit Hour**

**Student Level:** This course is open to students on the college level in either the freshman or sophomore year.

**Catalog Description:**

**MTH4419 CONTEMPORARY MATHEMATICS - (3 hrs)**

The mathematics of problem solving, geometry of shapes, number systems, statistics, functions and set theory. Note: This will not satisfy courses specifically designating college Algebra as a prerequisite.

**Prerequisites:** Minimum grade of C in MTH 4410 Intermediate Algebra or the equivalent, or placed based on mathematics course placement guidelines.

**Controlling Purpose:** This course is designed to meet the needs of students majoring in non-technical degree programs that do not require courses for which college algebra is a prerequisite, and for students who wish to survey some practical applications of mathematics to non-technical or non-STEM fields.

**Learner Outcomes:** Upon completion of this course the student will gain understanding of mathematics and problem solving. This course covers topics such as decision making, geometry of shapes, statistics, functions and graphs, set-theory and numerical systems. Prepares students for the mathematics encountered in other college courses that use quantitative reasoning. Emphasis on developing critical thinking and quantitative reasoning skills needed to understand major issues in society.

**Evaluation KEY:**

- A = All major and minor goals have been achieved and the achievement level is considerably above the minimum required for doing more advanced work in the same field
- B = All major goals have been achieved, but the student has failed to achieve some of the less important goals. However, the student has progressed to the point where the goals of work at the next level can be easily achieved.
- C = All major goals have been achieved, but many of the minor goals have not been achieved. In this grade range, the minimum level of proficiency represents a person who has achieved the major goals to the minimum amount of preparation necessary for taking more advanced work in the same field, but without any major handicap of inadequacy in his background.

- D = A few of the major goals have been achieved, but the student's achievement is so limited that he is not well prepared to work at a more advanced level in the same field.
- F = Failing, will be computed in GPA and hours attempted.
- N = No instruction or training in this area.

**Chapter 1: Thinking Critically**

**Outcomes: The student will learn critical thinking skills**

A	B	C	D	F	N	Specific Competencies
						<b>Demonstrate the ability to:</b>
						Identify an argument's premises and conclusions.
						Recognize fallacious arguments, which contain logical flaws.
						Evaluate media information using a five step method
						Distinguish between truth tables for negation, conjunction, disjunction, and conditional statements.
						Distinguish the difference between inclusion or exclusive "or".
						Identify the variations on the conditional including the converse, inverse and contrapositive.
						Identify set relationships such as subsets, disjoint sets, and overlapping sets.
						Describe the four standard categorical propositions.
						Apply Venn diagrams to illustrate set relationships and organize information.
						Evaluate inductive arguments in terms of strength.
						Evaluate deductive arguments in terms of validity and soundness.
						Evaluate Venn diagram tests of validity.
						Evaluate chains of conditionals.
						Propose a theorem inductively.
						Prove a theorem inductively.
						Apply the seven steps for critical thinking.

## Chapter 2: Approaches to Problem Solving

**Outcomes:** The student will be able to problem solve using units and know problems solving guidelines and hints.

A	B	C	D	F	N	Specific Competencies
						<b>Demonstrate the ability to:</b>
						Explain the key words per, of, square, cube and a hyphen.
						Write conversion factors in three equivalent forms.
						Explain that unit conversions mean multiplying by 1.
						Convert basic USCS and metric units.
						Identify metric prefixes.
						Distinguish between temperature units and convert between °F, °C, and Kelvin.
						Work with units to check answers and help solve problems.
						Identify energy units and power units.
						Apply the concept of density to materials, population, and information.
						Apply the concept of concentration to medical dosage problems, air and water pollution, and blood alcohol content.
						Apply the four- step problem solving process
						Apply the eight hints for problem solving.

## Chapter 3 Numbers in the Real World

**Outcomes:** The student will be able to apply numbers to real-world contexts to solve problems

A	B	C	D	F	N	Specific Competencies
						<b>Demonstrate the ability to:</b>
						Find absolute change, relative change, absolute difference, and relative difference.
						Explain the difference between the “of” versus “more than” rule.
						Explain the difference between percentage points versus %.
						Solve percentage problems.

### Chapter 3 Numbers in the Real World

**Outcomes:** The student will be able to apply numbers to real-world contexts to solve problems

A	B	C	D	F	N	Specific Competencies
						<b>Demonstrate the ability to:</b>
						Identify common abuses of percentages.
						Write and interpret numbers in scientific notation.
						Put numbers in perspective.
						Distinguish significant digits from nonsignificant zeros.
						Identify and distinguish between random and systematic errors.
						Find absolute error and relative error.
						Distinguish between accuracy and precision.
						Apply rounding rules for combining approximate numbers.
						Describe index numbers and how they are useful for comparisons.
						Find index number.
						Explain how the CPI is used to measure inflation.
						Adjust prices for inflation with the CPI.

### Chapter 4 Managing Money

**Outcomes:** The student will know the basics for managing money.

A	B	C	D	F	N	Specific Competencies
						<b>Demonstrate the ability to:</b>
						Explain the importance of controlling your finances.
						Demonstrate how to make a budget.
						Identify factors that determine whether your spending patterns make sense for your situation.
						Apply the various compound interest formulas.
						Explain investment types: stock, bond, and cash.

**Chapter 4 Managing Money**

**Outcomes: The student will know the basics for managing money.**

A	B	C	D	F	N	Specific Competencies
						<b>Demonstrate the ability to:</b>
						Interpret financial tables for stocks, bonds, and mutual funds.
						Utilize important principles of investing.
						Identify the uses and dangers of credit cards.
						Explain strategies for early payment of loans.
						Explain considerations in choosing a mortgage.
						Define different types of income as they apply to taxes.
						Apply tax rate tables to calculate taxes.
						Distinguish between tax credits and tax deductions.
						Calculate FICA taxes.
						Identify special tax rates for dividends and capital gains.
						Explain the benefits of tax-deferred savings plans.
						Distinguish between a deficit and a debt.
						Explain basic principles of the federal budget.
						Distinguish between publicly held debt and gross debt.
						Identify major issues concerning the future of Social Security.

**Chapter 5: Statistical Reasoning**

**Outcomes: The student will know the fundamentals of statistics and be able to judge the reliability of a statistical study.**

A	B	C	D	F	N	Specific Competencies
						<b>Demonstrate the ability to:</b>
						Identify and interpret the five basic steps in a statistical study and the importance of a representative sample.
						Explain the four common sampling methods.

**Chapter 5: Statistical Reasoning**

**Outcomes: The student will know the fundamentals of statistics and be able to judge the reliability of a statistical study.**

A	B	C	D	F	N	Specific Competencies
						<b>Demonstrate the ability to:</b>
						Distinguish between observational studies and experiments.
						Explain the placebo effect and the importance of blinding in experiments.
						Find a confidence interval from a margin of error.
						Apply eight guidelines for evaluating a statistical study.
						Interpret multiple bar graphs, stack plots, contour maps and other media graphs.
						Distinguish between true three-dimensional data and graphs that have a three-dimensional look for cosmetic reasons only.
						Identify and explain the common cautions about graphs.
						Distinguish between correlation and causality.
						Create and interpret scatterplots.
						Explain three possible explanations for a correlation.
						Apply six guidelines for establishing causality.

**Chapter 11: Mathematics and the Arts**

**Outcomes: Students will understand how mathematics can be used in the various arts.**

A	B	C	D	F	N	Specific Competencies
						<b>Demonstrate the ability to:</b>
						Identify how a plucked string produces sound.
						Measure frequency in cycles per second, and find harmonics of the frequency.
						Identify the musical scale and the ratios of frequencies among musical notes.
						Explain the difference between analog and digital representation of music.
						Explain the use of perspective in painting.
						Find the symmetries in paintings and tilings.
						Create tilings with regular or irregular polygons.

**Chapter 11: Mathematics and the Arts**

**Outcomes: Students will understand how mathematics can be used in the various arts.**

A	B	C	D	F	N	Specific Competencies
						<b>Demonstrate the ability to:</b>
						Explain and solve questions about the golden ratio and Fibonacci sequence.
						Explain the claimed uses of golden ratio in both art and nature.

**Chapter 12: Mathematics and Politics**

**Outcomes: The student will understand the basics of how mathematics is used in politics.**

A	B	C	D	F	N	Specific Competencies
						<b>Demonstrate the ability to:</b>
						Describe the mathematics involved in electing the U.S. president, including primaries, general election and electoral college.
						Identify variations on majority rule.
						Apply five methods for deciding an election with three or more candidates.
						Apply the four fairness criteria.
						Explain why no voting method can satisfy all fairness criteria in all cases.
						Explain approval voting as an alternative voting system.
						Explain variations in voting power when not all voters have equal weight.
						Describe the history of apportionment mathematics.
						Apply four apportionment methods.
						Identify the potential flaws of each method.
						Explain the significance of the Balinsky and Young theorem.

**Projects Required:** Instructor determined

**Text Book:** Contact the Bookstore for current textbook information.

**References:** None required.

**Materials/Equipment Required:** Scientific Calculator required, Graphing Calculator (TI-83, 83 Plus) recommended.

**Attendance Policy:** Students should adhere to the attendance discussed on the first day of class.

**Grading Policy:** Grading may vary according to the instructor.

**Maximum class size:** 25

**Refer to the following policies:**

[402.00 Academic Code of Conduct](#)

[263.00 Student Appeal of Course Grades](#)

[403.00 Student Code of Conduct](#)

**Disability Services Program:**

Cowley College, in recognition of state and federal laws, will accommodate a student with a documented disability. If a student has a disability which may impact work in this class which requires accommodations, contact the Disability Services Coordinator.