



Cowley County Community College  
& Area Vocational Technical School

COURSE PROCEDURE FOR

**ELEMENTARY STATISTICS**

MTH 4423 3 Credit Hours  
DIVISION OF GENERAL EDUCATION

**Student Level:** Freshman

**Prerequisite:** A minimum grade of C in MATH 4420 COLLEGE ALGEBRA.

**Controlling Purpose:** To introduce students to the fundamentals of analyzing statistical data from diverse areas of interest.

**Learner Outcomes:** Students who complete this course with a grade of A or B should be able to interpret sets of statistical data and understand the interpretations made by others.

**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.

**\*DENOTES OPTIONAL MATERIAL**

**INTRODUCTION TO STATISTICS**

**Section 1.1 – 1.5**

**Outcomes:** Students will discover the nature of statistics and data uses and abuses of statistics, design of experiments, good sampling methods.

A	B	C	D	F	N		Specific Competencies
							<b>Demonstrate the ability to:</b>
							Distinguish between a population and a sample.
							Distinguish between a parameter and a statistic.
							Identify the level of measurement of a set of data.
							Recognize the importance of good sampling methods and the serious deficiency of poor sampling methods.
							Understand the importance of good experimental design, including the control of variable effects, sample size, and randomization.

**DESCRIBING, EXPLORING, AND COMPARING DATA**

**Section 2.1 – 3.5**

**Outcomes:** The student will be able to consider methods for describing, exploring, and comparing data sets.

A	B	C	D	F	N		Specific Competencies
							<b>Demonstrate the ability to:</b>
							Summarize the data by constructing a frequency table or relative frequency table.
							Construct a histogram dotplot, stem-and leaf plot, pie chart, and Pareto chart.
							Calculate measures of center by finding mean, median, mode, and midrange.
							Calculate measures of variation by finding standard deviation, variance, and range.
							Calculate individual values by using z scores, quartiles, deciles, or percentiles.
							Investigate and explore the spread of data, the center of data, and the range of values by constructing a boxplot.

**PROBABILITY**

**Sections 5.1 – 5.6**

**Outcomes:** The student will understand the basic concepts of probability theory including notation, basic definitions, addition rule, multiplication rule, fundamental counting rule, factorial rule, permutations rule, and combinations rule.

A	B	C	D	F	N		Specific Competencies
							<b>Demonstrate the ability to:</b>
							Understand basic definitions and notation.
							Understand the probability of any event.
							Find the complement of an event.
							Use of the addition rule for compound events.
							Use of the multiplication rule for compound events.
							Use of the following counting techniques: fundamental counting rule, factorial rule, permutations rule, combinations rule.

**DISCRETE PROBABILITY DISTRIBUTIONS**

**Section 6.1 – 6.4**

**Outcomes:** The student will understand the concept of probability and binomial distributions including random variables, computing mean and standard deviation, constructing a probability distribution; and the Poisson probability distribution.

A	B	C	D	F	N		Specific Competencies
							<b>Demonstrate the ability to:</b>
							Understand a random variable has values that are determined by chance.
							Understand a probability distribution consists of all values of a random variable along with their corresponding probabilities.
							Compute the mean and standard deviation to explore a binomial distribution.
							Compute the mean and standard deviation to explore a probability distribution.
							Understand that with a binomial distribution there are two categories of outcomes and a fixed number of independent trials with a constant probability.
							Compute a Poisson probability distribution which applies to occurrences of some event over a specific interval, and its probabilities.

**NORMAL PROBABILITY DISTRIBUTIONS**

**Sections 7.1 – 8.2**

**Outcomes:** The student will understand continuous probability distributions and focus on the most important category: normal distributions.

A	B	C	D	F	N		Specific Competencies
							<b>Demonstrate the ability to:</b>
							Graph a normal distribution.
							Use a Normal distribution to approximate a Binomial Distribution.
							Convert values to standard scores (z scores).
							Verify the solution(s) of the normal distribution.
							Utilize the Central Limit Theorem.
							Understand the Rare Event Rule.
							Utilize the continuity Corrections procedure.
							Determine whether data have a Normal distribution.

**ESTIMATES AND SAMPLE SIZES**

**Sections 9.1 – 9.5**

**Outcomes:** The student will understand the fundamental and important concepts of inferential statistics with a focus on methods for finding estimates of population means, proportions, and variances and develop procedures for finding point estimate, confidence interval, and required sample size.

A	B	C	D	F	N		Specific Competencies
							<b>Demonstrate the ability to:</b>
							Interpret a Confidence Interval
							Find Critical Values
							Determine the Margin of Error.
							Find the Point Estimate and E from a Confidence Interval.
							Use a Confidence Interval to describe, explore, and compare data.
							Estimate the Proportion $p$ .
							Estimate a Population Mean: Large and Small Samples.
							Estimate a Population Variance.
							Use properties of the distribution of the Chi-Square Statistic.
							Find the confidence interval (or interval estimate) for the Population Variance.
							Determine the sample size.

**HYPOTHESIS TESTING**

**Sections 10.1 – 10.7**

**Outcomes:** The student will be able to present methods for testing claims about a population mean, proportion, standard deviation, and variance and draw a conclusion.

A	B	C	D	F	N		Specific Competencies
							<b>Demonstrate the ability to:</b>
							Understand the fundamentals of hypothesis testing.
							Determine the null and alternative hypotheses.
							Find critical values.
							Determine whether it is a two-tail, left-tail, or right-tail test.
							Draw a conclusion from the hypothesis test.
							Use steps in testing a hypothesis.
							Determine the <i>P</i> -Value of testing hypothesis.
							Test claims with confidence intervals.
							Test claims with proportions.
							Test a claim about a mean: large and small samples.
							Test a claim about a standard deviation or variance.

**INTERENCES FROM TWO SAMPLES**

**Sections 11.1 – 11.4**

**Outcomes:** The student should be able to do hypothesis tests considering two samples drawn from two populations.

A	B	C	D	F	N		Specific Competencies
							<b>Demonstrate the ability to:</b>
							Draw inferences about two proportions.
							Draw inferences about two means: Independent and large Samples.
							Draw inferences about two means: Independent and Large Samples; matched Pairs; Independent and Small Samples.
							Determine confidence Interval Estimates.
							Compare Variation in two samples.

**Outcomes:** The student should be able to investigate relationships and correlations between two or more variables.

A	B	C	D	F	N		Specific Competencies
							<b>Demonstrate the ability to:</b>
							Use scatter diagrams and linear correlation coefficient to decide whether there is a linear correlation between two variables.
							Use methods for finding the equation of the regression line.
							Use the concept of total variation with components of explained and unexplained variation.
							Determine procedure for obtaining a multiple regression equation.
							Explore the basic concepts of developing a mathematical model including nonlinear functions.

\* Denotes optional material

**Projects Required:** None.

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

**References:** None.

**Materials/Equipment needed:** Text, Graphing Calculator (TI-83 Plus)

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

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

**Maximum Class Size:** 25.

**Catalog Description of the Course:**

**MTH4423 ELEMENTARY STATISTICS.** 3 HRS. An introduction to frequency distributions, measures of central tendency, sampling distributions, t-test and chi-square test, hypothesis testing, and correlation coefficients. This course requires that the student furnish their own TI-83 or TI-83 PLUS graphing calculator. Prerequisite: Minimum grade of C in MTH4420.

**Academic Code of Conduct:**

Cowley College is committed to instilling in its students a high level of academic integrity. Integrity in the classroom is a definite expectation. Students who compromise the integrity of the academic process are subject to disciplinary action by the college.

A violation of academic integrity includes but is not limited to:

- Plagiarism
- Cheating
- Fabrication and Falsification

- Multiple Submission
- Misuse of Academic Materials
- Complicity in Academic Dishonesty

**If a student is ever in doubt about the specific guidelines governing individual or group work with respect to a particular course or assignment, be sure to ask the instructor for clarification.**

## **XF Grade**

In accordance to the Academic Code of Conduct, an XF grade may be given to:

1. Students who are guilty of academic misconduct on tests or major assignments.
2. Students who knowingly facilitate classmates in academic misconduct on tests or major assignments (will be based upon the decision of the Appeals Committee).
3. Students who commit repeat violations of the Academic Code of Conduct on any class assignments.

**The Academic Code of Conduct will be used to define academic misconduct.**

If an instructor determines a student should receive an XF grade:

1. The instructor will meet with the student and follow the Academic Code of Conduct to ensure that the student has an initial opportunity to respond.
2. If the instructor still believes the student should receive an XF grade, the instructor will notify the Instructional Office and complete an XF form.
3. The student will then be notified of his/her right to appeal by the Appeals Committee, which will be scheduled as needed.
4. If the student chooses to appeal the X portion of the grade, the Appeals Committee will have the final authority.
5. The student will have the opportunity to remain in the class until the appeal process has been completed. Formal withdrawal from the class will not prevent the student from receiving a grade of XF.
6. A student may not withdraw from a class after receiving a grade of XF.
7. The decision of the Appeals Committee will be the final decision. The student, teacher, and advisor will be notified within 4 business days

To have the first XF grade removed from his/her transcript, the student must perform 20 hours of community service and successfully complete a course on academic honesty by the end of the following semester. The community service will be arranged through A.C.E.S. and will be completed at the discretion of the A.C.E.S. sponsor. The course will be for 1 credit hour at the student's expense with no financial aid or scholarship assistance. The Instructional Office may keep internal records that show the student received an XF grade that was later converted to an F after completion of the required community service and short course on academic honesty.

If a student receives an XF grade for a second time, that grade will remain on his/her transcript with no opportunity for removal. An XF grade cannot be erased from the Academic Fresh Start program.

## **Academic Misconduct**

### First Level Resolution

The original jurisdiction of any case involving academic misconduct shall be with the faculty member whose course the alleged misconduct occurred. If a faculty member suspects a student of an academic misconduct, he/she must inform the student without unnecessary delay of the alleged misconduct and provide the student the opportunity to respond before taking any action. Students suspected of academic misconduct, whether acknowledging involvement or not, shall be allowed to continue the course without prejudice pending disciplinary actions. If the faculty member takes no action within 10 days after informing the student, the allegations shall be considered dismissed.

The faculty member may take one or more of the following actions: alter a grade or assign a grade of "F" in the assignment, examination, or the course and/or recommend an additional sanction up to and including suspension and/or dismissal from the course. The action taken by the faculty member should be reported to their Department Chair/Director and the Instructional Office. The student so affected shall have the right of appeal through the Vice President of Academic and Student Affairs.

### Second Level Resolution

If a second offense of academic misconduct occurs during the student's academic career, this WILL result in administrative withdrawal from the institution for a period of one academic year. The student so affected shall have the right of appeal through the Vice President of Academic and Student Affairs.

### Third Level Resolution

After one academic year the affected student may re-enroll with the understanding if a violation of the Academic Code of Conduct occurs during their tenure at Cowley College the result will be permanent expulsion from the institution with no right of appeal.

(Institutional Policies: Student Affairs Council: Series 400.00: 402.00 Academic Code Of Conduct)

### **Disability Services Program:**

Cowley College, in recognition of state and federal laws, will accommodate a student with a documented disability. If you have a disability which may impact your work in this class and for which you require accommodations, please contact Mark A. Richardson, the Disability Services Coordinator, located in the Nelson Student Center Room 203 in order for arrangements of needed accommodations. Phone number: Main Campus - 620-441-5557 or North Campuses - 316-554-2724.

E-mail: [richardson@cowley.edu](mailto:richardson@cowley.edu)

### **Grade Change/Appeal:**

If a student is dissatisfied with a course grade issued by an instructor and believes the grade issued is incorrect, the student may use the following appeal procedures:

- The student shall, within one academic semester following issuance of the grade, confer with the instructor and outline the reason(s) the student feels the grade is incorrect.
- The instructor shall advise the student of the grade change-if applicable.
- If the student is not satisfied with the results of the conference, he/she may request a Student Grade Appeal Form in the office of the Vice President of Academic and Student Affairs or the Dean of North Campuses. A review conference shall be held within the semester that the appeal

is filed. The Vice President of Academic and Student Affairs, or their designee, the instructor who issued the grade, the Chairperson of the department or the Instructional Director involved or their designee will comprise the committee. The Vice President of Academic and Student Affairs will issue a decision and notify the student in writing within ten (10) days following the review. This decision is final.

(Institutional Policies: Academic Affairs Council: Series 200.00: 263.00 Student Appeal of Course Grade)

### **Student Code of Conduct**

Students attending Cowley College are expected to conduct themselves as responsible individuals at all times while on campus. Acts of incivility or other behavior which interferes with or detracts from the learning-centered environment are not acceptable. In addition, student actions which violate school policies or local, state, or federal laws are not tolerated and may result in dismissal from the college or other disciplinary action.

- Intoxicating Beverages and/or Illegal Drugs: No alcoholic or cereal malt beverages and/or illegal drugs shall be allowed on the campus or at school-sponsored functions.
- Tobacco: Smoking is not permitted in College facilities. This includes smokeless tobacco products.
- Dress and Appearance: Students are expected to be clean and dress within the limits of general trends of dress at this college. Additionally, dress must be in accordance with all laws pertaining to health, sanitation, and insurance.
- Classroom Expectations: Students are expected to behave in a civil and professional manner in the classroom. Instructors shall not permit the continued presence of disruptive behavior in class.
- Visitors and Children: Only students who are enrolled in classes are allowed to attend. Children and visitors must have prior approval from administration to attend class sessions. While on campus children and visitors must adhere to all school policies. All children under the age of 16 must be under direct supervision of a parent or guardian while on campus.
- Destruction of Property and/or Theft: Students are expected to respect the rights and property of other students, faculty, staff, etc.
- Student Identification Cards: All enrolled students at Cowley College are required to obtain a student ID card. Students must carry their current ID card with them at all times on campus.
- Electronic Devices: Cellular phones, pagers and other electronic devices shall not be used in a manner that causes disruption in the classroom, library or within any college-owned or college-operated facilities. This includes abuse of cellular devices with photographic capability. Utilizing these devices for the purposes of photographing test questions or other forms of academic misconduct or illegal activity is prohibited, as is photographing individuals in secured areas such as lavatories or locker rooms. Taking photographs of any individuals against their will is strictly prohibited.

(Institutional Policies: Student Affairs Council: Series 400.00: 403.00 Student Code Of Conduct)