MASTER COURSE OUTLINE

A. MATH 2021 Fundamentals of Statistics

B. COURSE DESCRIPTION:

This course is an introduction of basic statistical methods including sampling, analyzing a research study, measures of central tendency and dispersion, probability, confidence intervals, hypothesis testing of means and proportions, Chi-square, analysis of variance, correlation, and regression. The use of statistical software is included in this course. College-level reading ability in English is strongly recommended. Prerequisite: Math 0660 or appropriate placement in course based on Multiple Measures for Course Placement – Math Decision Band Chart.
MnTC (Goals 4/MA and 2/CT); (4 Cr - 4 lect, 0 lab)

C. *MnTC Discipline: Mathematics/Logical Reasoning **Core Theme: Critical Thinking

D. RIVERLAND INSTITUTIONAL LEARNING OUTCOMES:

This course addresses the following Riverland Institutional Learning Outcome(s):
☒ ILO 1: critical thinking *(Core Theme Goal 2)*
☐ ILO 2: awareness of the larger global community *(Core Theme Goal 7 or 8)*
☐ ILO 3: ethical, engaged citizenship *(Core Theme Goal 9 or Goal 10)*
☐ ILO 4: communication and collaboration *(Discipline Goal 1 and by any learning outcome(s) involving communication or collaboration)*

E. MAJOR CONTENT AREAS:

- Introduction to Statistics
  - Definitions and data classification
  - Types of studies and types of samples
  - Critiquing a published study

- Graphical displays of data
  - Frequency distributions
  - Graphical displays of data
  - Analyzing graphs

- Numerical descriptions of data
  - Measures of center

- Measures of dispersion
- Measures of relative position

- Probability and randomness
  - Introduction to probability
  - Additional rules for probability (optional)

- Discrete probability distributions
  - Discrete random variables
  - Binomial distribution

- Normal probability distributions
  - Introduction to the normal distribution
  - Finding area/probability under a normal distribution
  - Central limit theorem with means
  - Central limit theorem with proportions

- Confidence intervals
  - Estimating population means
  - Estimating population proportions
  - Estimating population variances (optional)

- Hypothesis testing
  - Fundamentals of hypothesis testing
  - Testing a population mean
  - Testing a population proportion
  - Testing a population variance (optional)
  - Chi-Square Test
  - Testing two population means
  - Testing two population proportions
  - ANOVA

- Correlation and regression
  - Scatter plots and correlation
  - Linear regression

F. GOAL TYPES, OBJECTIVES, AND OUTCOMES:

GOALS	**OBJECTIVES** **Students will be able to**	**OUTCOMES** **The student will successfully**
MnTC Goal 4b	clearly express mathematical/logical ideas in writing.	1. interpret results of hypothesis tests and state conclusions based on analysis. 2. apply critical evaluating questions to critique research.
MnTC Goal 4c	explain what constitutes a valid mathematical/logical argument (proof).	1. explain how decision was made to reject/fail to reject null hypothesis and state the practical application of this decision.

MnTC Goal 4d	apply higher-order problem-solving and/or modeling strategies.	1. determine a linear model for a given situation and interpret its meaning.
MnTC Goal 2a	gather factual information and apply it to a given problem in a manner that is relevant, clear, comprehensive, and conscious of possible bias in the information selected.	1. calculate measures of center and measures of dispersion with respect to a given dataset. 2. calculate probabilities using basic probability rules. 3. calculate probabilities using a normal distribution and/or Central Limit Theorem.
MnTC Goal 2b	imagine and seek out a variety of possible goals, assumptions, interpretations, or perspectives which can give alternative meanings to solutions to given situations or problems.	1. determine which test statistic should be used, verify assumptions, and calculate the appropriate confidence interval.
MnTC Goal 2d	recognize and articulate the value assumptions which underlie and affect decisions, interpretations, analyses, and evaluations made by ourselves and others.	1. apply critical evaluating questions to critique research.

G. SPECIAL INFORMATION:

This course may require use of the Internet, the submission of electronically prepared documents and the use of a course management software program. Students who have a disability and need accommodations should contact Accessibility Services at the beginning of the semester. This information will be made available in alternative format, such as Braille, large print, or current media, upon request.

H. COURSE CODING INFORMATION:

Course Code A/Class Maximum 48; Letter Grade

Revision date: 09/01/16; 03/04/21; 03/28/22; 03/28/22
AASC Approval date: 09/20/16; 05/08/18; 03/23/21; 04/19/22; 03/28/22

***Riverland Community College Disciplines**	**MnTC Goal Number**
Communication (CM)	**1**
Natural Sciences (NS)	**3**
Mathematics/Logical Reasoning (MA)	**4**
History and the Social & Behavioral Sciences (SS)	**5**
Humanities and Fine Arts (HU)	**6**

**Riverland Community College Core Themes	MnTC Goal Number
Critical Thinking (CT)	**2**
Human Diversity (HD)	**7**
Global Perspective (GP)	**8**
Ethical and Civic Responsibility (EC)	**9**
People and the Environment (PE)	**10**

*These five MnTC Goals have been identified as Riverland Community College Disciplines.
** These five MnTC Goals have been identified as Riverland Community College Core Themes. NOTE: The Minnesota Transfer Curriculum "10 Goal Areas of Emphasis" are reflected in the five required discipline areas and five core themes noted in the Riverland Community College program of study guide and/or college catalog.