SYLLABUS

MATH 10041 – Introductory Statistics

(4 Credit Hours)

Catalog Information: An introduction to statistical thinking and statistical methods. Emphasis is on statistical literacy, conceptual understanding and active learning in the classroom. Prerequisite: minimum 22 math ACT score; or minimum 520 math SAT score; or minimum 35 ALEKS® math assessment score; or minimum C (2.0) grade in MATH 00022; or any higher-level MATH course.

Text: Gould, R., Ryan, C., and Rebecca Wong. (2017). Essential Statistics, Exploring the World through Data, 2nd ed. New York: Pearson.

Note: The class meets two days a week for 100 minutes each day. The course is activity based and designed according to the Guidelines for Assessment and Instruction in Statistics Education. (GAISE).

Introduction to Data (2 days)
- Classifying and storing data
- Organizing categorical data
- Sampling methods and design of experiments

Picturing Variation with Graphs (2 days)
- Visualizing variation with numerical data
- Summarizing important features of a numerical distribution
- Visualizing variation in categorical variables
- Summarizing categorical distributions
- Interpreting graphs

Numerical Summaries of Center and Variation (2.5 days)
- Summaries of symmetric distributions
- The empirical rule and z-scores
- Summaries for skewed distributions
- Comparing measures of center
- Using boxplots for displaying summaries

EXAM 1

Regression Analysis: Exploring Association between Variables (1.5 days)

- Visualizing variability with scatterplots
- Measuring Strength of Association with Correlation
- Modeling linear trends - Least-squares regression
- Evaluating the linear model

Modeling Variation with Probability (4 days)

- What is Randomness?
- Finding theoretical Probabilities - sample space, basic probability, addition rule, multiplication rule, mutually exclusive events, independent events
- Associations in categorical variables including conditional probability
- Law of large numbers

EXAM 2

Modeling Random Events: The Normal and Binomial Models (3 days)

- Probability distributions – discrete and continuous
- The Normal model and its applications
- The Binomial Model and its applications

Survey Sampling and Inference (3.5 days)

- Learning about the world through surveys
- Measuring the quality of a survey
- Sampling distributions, Central Limit Theorem for sample proportions
- Estimating the population proportion with confidence intervals

EXAM 3

Hypothesis Testing for Population Proportions (4.5 days)

- Main ingredients of hypothesis testing
- Hypothesis testing in four steps
- Characterizing p-values
- Hypothesis testing in four steps – the one proportion z-test

Inferring Population Means (4 days)

- Sampling distribution of means
- Central Limit Theorem for sample means
- Answering questions about the mean of a population

- Hypothesis testing for means
- Overview of analyzing means

EXAM 4

REVIEW

FINAL EXAM