KINE 394 Statistics and Evaluation

General Information

CRN **11410**

Instructor Ted W. Mittler, PhD

Office The Mews, Earl Gregg Swem Library

Access (757) 273-9499; twmittler@wm.edu

Office Hours By appointment

Textbook William J. Vincent, *Statistics in Kinesiology, Third Edition*. Champaign, Illinois: Human Kinetics, 2005.

Materials

1. Electronic calculator (optional but very useful)
2. Rectangular coordinate graph paper (available on your Blackboard under "Resources")
3. Columnar ruled data sheets (available on your Blackboard under "Resources")
4. Laptop computer, with Outlook or other dedicated email client and Excel, with Analysis ToolPak enabled

Description An introduction to the use of statistics within the process of evaluation. Descriptive and inferential statistical procedures including confidence intervals, correlation, t-tests, and analysis of variance are covered. Proper application of those procedures during the evaluation of data is emphasized. ***This course satisfies the requirements of GER 1 — Mathematics and Quantitative Reasoning.***

Objectives

(A) For all GER-1 Courses

Students will:

1. understand why approaches and calculations used in the course work.
2. apply mathematics to study real-world problems.
3. carry out numerical calculations by hand or by using calculators or computers.

(B) Specific to KINE 394

Students will:

1. understand the role of statistics and evaluation in education, in allied health fields, and in research.
2. know the definition and appropriate use of terms and concepts commonly used in testing, measurement, evaluation, and statistical research.
3. manipulate data to construct graphical representations, and to calculate commonly used statistics.
4. demonstrate the proper use of statistics in the analysis and evaluation of data.
5. use calculators and personal computers for data analysis.

Instruction This is primarily a lecture course. Students will be expected to supplement the lectures by reading the text and to practice statistical techniques by working problems both by hand and with the assistance of statistical computer programs.

Attendance Because regular class attendance is crucial to academic success, the instructor reserves the right to use any legal means to minimize the incidence of unscheduled absences.

Honor Code Under the Honor Code of the College of William & Mary, it is expected that all students will demonstrate honesty and integrity in their conduct. All in-class exams and quizzes in this class are to be taken without the assistance of books, notes or other people. Students are encouraged to work together on homework assignments, but at all times, the work submitted must be the student's own.

Evaluation The final grade will be a weighted average of problem assignments and quizzes (20%), two one-hour tests (20% each), and a final examination (40%). All grades will be reported on the following scale:

D–	60.0	C–	70.0	B–	80.0	A–	90.0
D	63.3	C	73.3	B	83.3	A	93.3
D+	66.7	C+	76.7	B+	86.7		

KINE 394 Statistics and Evaluation

Class Schedule (Fall, 2011)

1	**Aug 24:**	Student Information and Introductions, Course Outline, The Language of Statistics *Preparatory Reading:* Chapter 1 (to p 7)
2	**26:**	Excel Basics, Making Sense of Numerical Data: Rank Distributions, Stem and Leaf Plots, Frequency Distributions *Preparatory Reading:* Chapter 2
3	**29:**	Grouped Frequency Distributions, Using Excel for Simple and Grouped Frequency Distributions *Due Today:* **Problem Set 1: Entering and Manipulating Data**
4	**31:**	Histograms, Presentation of Histograms, Common Shapes, Frequency Polygons, Cumulative Frequency Polygons (Ogives)
5	**Sep 2:**	Presentation of Data Using Excel *Due Today:* **Problem Set 2: Presentation of Data**
6	**5:**	The Mode, the Median *Preparatory Reading:* Chapter 4 *Due Today:* **Problem Set 3: Presentation of Data (Excel)**
7	**7:**	The Mean, Other Measures of Central Tendency, General Observations on Measures of Central Tendency
8	**9:**	Non-Parametric Measures of Dispersion: Range, Interquartile Deviation *Preparatory Reading:* Chapter 5 *Due Today:* **Problem Set 4: Central Tendency**
9	**12:**	Quartiles and Box Plots, Outliers
10	**14:**	Theory of Measurement, Error (Variation) in Measurement
11	**16:**	Variance and Standard Deviation, General Observations on Measures of Dispersion
12	**19:**	*Due Today:* **Problem Set 5: Dispersion and Box Plots**
13	**21:**	**TEST 1**
14	**23:**	Post-Mortem Test I

15 **26:** Probability and the Normal Curve: From Coin Flips to Pascal's Triangle, The Gaussian Distribution
Preparatory Reading: Chapter 6 (to p 81)

16 **28:** Calculating z-scores, Reading Tables of Normal Probabilities, Transformations, Using Excel to Find Probabilities

17 **30:** Correlation and Regression: Scattergrams, Pearson Product-Moment Correlation, Outliers
Preparatory Reading: Chapter 7 (to p 112)
Due Today: **Problem Set 6: The Normal Curve and Transformations**

18 **Oct 3:** Linear Regression, Prediction from the Regression Line

19 **5:** Ranking

20 **7:**

9: **Fall Break**

21 **12:** Spearman Rank-Difference Correlation
Preparatory Reading: Chapter 13 (pp 246-248)

22 **14:** General Observations on Correlation and Regression
Due Today: **Problem Set 7: Correlation and Regression**

23 **17:** Hypotheses
Due Today: **Problem Set 8: More Correlation and Regression**

24 **19:** Genesis of a Statistical Hypothesis
Preparatory Reading: Chapter 1 (p 7 to end)

25 **21:** Errors in Statistical Decisions, the Rare Event Rule

26 **24:** *Due Today:* **Problem Set 9: Hypotheses**

27 **26:** **TEST 2**

28 **28:** Post-Mortem Test 2

29 **31:** Statistical Sampling

30 **Nov 2:** Chi Square Goodness of Fit
Preparatory Reading: Chapter 13 (to p 246)

31 **4:** Chi Square Contingency Table

32 **7:** The Central Limit Theorem
Preparatory Reading: Chapter 6 (p 81 to end)
Due Today: **Problem Set 10: Chi Square**

33 **9:** Review Tools of Inferential Statistics

34 **11:** Confidence Intervals about a Mean

35 **14:** Confidence Intervals for Proportions

36 **16:** Student's t, One-Sample t-Test
Preparatory Reading: Chapter 8
Due Today: **Problem Set 11: Confidence Intervals**

37 **18:** t-Test of Independent Samples

38 **21:** t-Test of Correlated Samples

23: **Thanksgiving**

25: **Thanksgiving**

39 **28:** t-Test of a Correlation Coefficient

40 **30:** Analysis of Variance
Preparatory Reading: Chapter 9
Due Today: **Problem Set 12: t Tests**

41 **Dec 2:** *Due Today:* **Problem Set 13: Analysis of Variance**

7: **Final Examination** (2:00-5:00 pm)