WINONA STATE UNIVERSITY

COLLEGE OF SCIENCE AND ENGINEERING

DEPARTMENT OF MATHEMATICS AND STATISTICS

**Course Outline – STAT 301**

**Title:** Statistical Thinking for Healthcare

**Number of Credits:** 3

**Catalog Description:** An introductory course of statistical applications to the health sciences. Descriptive statistics, sampling, techniques of estimation, and hypothesis testing are included. The understanding of statistical applications as presented in health sciences research will be emphasized. Prerequisites: Declared major in RN to BSN or CLS completion program, MATH 100 – Survey of Mathematic or higher, STAT 110 – Fundamentals of Statistics or higher, or instructor permission. MEETS: Goal 4

**Possible Textbooks:**

* Baldi, B. and Moore, D. *The Practice of Statistics in the Life Sciences*. 2nd Edition.   
  (ISBN:978-1429272728)
* Utts, J. and Heckard, R. *Mind on Statistics*. 4th Edition. (ISBN: 978-0538733489)

**Topics Covered:**

1. Introductory terms and methods of data collection
   1. Data types
   2. Surveys
   3. Experiments
2. Descriptive statistics
   1. Histograms and stem plots
   2. Scatterplots and correlation
   3. Numerical summaries
3. Introduction to probability
   1. Role of probability in decision making
   2. Use of the standard normal table
   3. Conditional probability
   4. Relative risk and odds ratios
4. Sampling distributions
   1. Central limit theorem
   2. Standard error
5. Confidence interval estimation
   1. Means
   2. Proportions
6. The logic and applications of hypothesis testing
   1. Means
   2. Proportions
7. Hypothesis testing applications
   1. Means
   2. Proportions
8. Contingency table analysis
   1. Goodness of fit
   2. 2x2 tables
9. Regression analysis
   1. Simple linear regression
   2. Introduction to logistical regression
10. Introduction to Analysis of Variance
11. Review of a journal paper to assess statistical validity

**Listing of Sections to be Covered:** Not applicable to this course, since there is no standard textbook. Chosen sections of any text should correspond to the topics outlined above.

**Remarks:** None.

**Approximate Pace of Coverage:** Not Applicable.

**Method of Instruction:** Methods may include lecture, case studies, discussion, group work, problem solving sessions, computer sessions, and discussion of computer output.

**Evaluation Procedure:** Assessments will vary in style and may include written exams, quizzes, homework assignments, and journal article critiques.

**Minnesota Transfer Curriculum:** Critical Analysis Intensive

* Recognize and evaluate appropriate evidence to advance a claim.
* Apply critical analytical skills in making decisions or in advancing a theoretical position.
* Evaluate alternative arguments, decision strategies, or theories within a systematic framework and validity of arguments.

**MnSCU Learning Outcomes:**

* This course will promote a student’s ability to apply statistical thinking to studies reported in journals and to their own investigations that generate data.
* This course will promote a student’s ability to collect the right data to answer a question or test a research hypothesis.
* This course will promote a student’s ability to apply the best testing methods to collected data for the purpose of gaining information and making inferences.
* This course will promote a student’s ability to interpret the results of statistical tests.

**Possible Computer Software:**

* JMP

**Last Revised:** Fall 2012 by the Statistics Subgroup.