STATISTICS — MATS 1251

A. **Course Description**

- **Credits:** 4.00
- **Lecture Hours/Week:** 3.00
- **Lab Hours/Week:** 1.00
- **OJT Hours/Week:** 0
- **Prerequisites:**

  - MATS 0600: Intermediate Algebra
  - MATS 0700: Algebra Emporium

- **Corequisites:** None
- **MnTC Goals:**

  - 04 – Mathematical/Logical Reasoning

Fundamental principles of inferential statistics are presented in lecture (3 hrs) augmented by computer labs using Excel (2 hrs). Essential topics include sampling methods; descriptive statistics; counting and probability; binary, normal, and other probability distributions; confidence intervals; hypothesis testing; inferences from two samples; correlation and regression. Optional topics include goodness-of-fit and contingency tables; ANOVA; nonparemetrics; and statistical process control. Meets MnTC Goal 4

B. **Course Effective Dates:** 8/21/06 – Present

C. **Outline of Major Content Areas**

1. Bell curve
2. Confidence Intervals
3. Descriptive Statistics
4. Further Topics including; Inferences from two samples, Correlation and regression Goodness-of-fit and contingency tables,ANOVA,Nonparametric statistics,Statistical process control
5. Hypothesis Testing
6. Probability

D. **Learning Outcomes**

1. apply the Wilcoxon rand-sum-test for two independent samples
2. test claims about proportions
3. Critically analyze statistical claims

4. Explore data independently and draw justifiable conclusions
5. Present convincing statistical arguments backed up by persuasive graphics
6. State conclusions of hypothesis tests carefully and precisely
7. apply Poisson distribution to practical problems
8. apply binomial probability distribution to practical problems
9. apply rank correlation analysis
10. apply runs test for randomness
11. apply the Kruskal-Wallis test
12. apply the Wilcoxon signed-ranks test for matched pairs
13. apply the classical definition of probability
14. apply the normal distribution to practical problems
15. apply the sign test
16. calculate and interpret various measures of center (mean, media, mode, midrange)
17. calculate and interpret various measures of position (quartiles, percentiles, z-scores)
18. calculate and interpret various measures of variation (range, interquartile range, standard deviation)
19. compare variations in two samples
20. distinguish among the classical, experimental, and subjective methods of calculating probability
21. estimate a population mean using small samples: Student-
22. estimate a population mean using small samples: Student-T
23. estimate a population proportion
24. estimate a population standard deviation: chi square
25. explain the concept of correlation
26. explain the significance of the Central Limit Theorem
27. find linear and other regressions
28. make inferences about two means: independent samples
29. make inferences about two proportions
30. make inferences from matched pairs
31. perform one-way ANOVA analysis
32. perform two-way ANOVA analysis
33. represent data in various pictorial forms
34. summarize data with frequency tables
35. test claims about means
36. test claims about standard deviation or variance
37. use the addition rule in calculating probability

E. **Minnesota Transfer Curriculum Goal Area(s) and Competencies**

Goal 04 — Mathematical/Logical Reasoning

1. Clearly express mathematical/logical ideas in writing.
2. Explain what constitutes a valid mathematical/logical argument(proof).

3. Apply higher-order problem-solving and/or modeling strategies.

F. **Learner Outcomes Assessment**

      As noted on course syllabus

G. **Special Information**

      None noted