University of Manitoba
Department of Statistics

STAT 3380
An Introduction to Nonparametric Statistics
Fall Term 2009

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Office Hours: Monday/Wednesday from
1:30 pm — 2:30 pm ; Tues 11:30 am -12:30 pm
OR by appointment

Departmental Webpage: http://www.umanitoba.ca/statistics/
Some information (e.g. notes will be posted on the website for your convenience. However, you will still be responsible for any other information given in class.

Textbook: Wayne W. Daniel "Applied Nonparametric Statistics", 2nd Edition, Brooks/ Cole, Duxbury Thomson Learning 1990 ISBN 0-534-38194-4

Computer Package: The software *JMP* or *SPSS* will be used sometimes in this course to show the solution of some problems.

Marking Scheme:

Assignments	15%
Midterm Test	35%
Final Exam	50%

Reminders on Assignments: There will be five (5) assignments for the whole term. All assignments are due in class before the lectures.
All your assignments should be written on 8.5 X11 paper, using one side only and should be properly stapled at the left corner.
Answer the questions in the given order.
Late assignments will **NOT be accepted.**
Messy assignments or those with poor handwriting will be returned with a mark of "0".

Test and Exam: There will be a term test on **October 28, 2009 (Wednesday)** during **class hour** i.e. **12:30 pm - 1:20 pm**.
Final examination will be scheduled by the University Registrar**.**

Reminders on Test and Exam: Non- programmable calculators are allowed
Formula sheet and statistical tables will be provided if required.

Academic Dishonesty : It is important that you understand what constitutes academic dishonesty and that you are familiar with the very serious consequences. Links to resources that that describe academic dishonesty (including plagiarism, cheating, inappropriate collaboration and examination impersonation) can be found at:
http://www.umanitoba.ca/faculties/science/student/webdisciplinedocuments.html
or through the Faculty of Science home page at:
http://www.umanitoba.ca/faculties/science
Typical penalties imposed within the Faculty of Science for academic dishonesty are also described.

Voluntary Withdrawal Date: The voluntary withdrawal date is **November 18, 2009** by which time you will have received your marks for the midterm test and probably 3 assignments.

Course Content:

I. Introduction
II Review of Basic Statistics
- (a) Some Important Terminology
- (b) Hypothesis Testing:
  Statistical Significance versus Practical Significance;
  Power of Hypothesis Testis; Efficiency of Hypothesis Tests
- (c) Estimation
- (d) Measurement Scales: Nominal, Ordinal, Interval, and Ratio
- (e) Nonparametric Statistics: History;
  Advantages and Disadvantages; When to Use
  Nonparametric Procedures

III. Procedures that utilize Data from a Single Sample
- (a) Making Inferences about a Location Parameter
  One-Sample Sign Test; Wilcoxon Signed-Ranks Test
- (b) Making Inferences about a Population Proportion
  Binomial Test
- (c) One-Sample Runs Test for Randomness
- (d) Cox-Stuart Test for Trend

IV. Procedures that utilize Data from Two Independent Samples
- (a) Making Inferences about the difference between two location parameters:
  - Median Test; Mann-Whitney Test
- (b) Some Miscellaneous Two Sample Tests
  - Wald-Wolfowitz Runs Test
  - Fisher Exact Test

V. Procedures That Utilize Data From Two Related Samples
- (a) Procedures for Testing Hypotheses about Location Parameters
  - Sign Test for Two Related Samples
  - Wilcoxon Matched-Pairs Signed-Rank Test
- (b) Confidence Interval Procedures for the Median Difference
- (c) Test for Two Related Samples When Data Consists of Frequencies

VI. Chi-Square Tests of Independence and Homogeneity
- (a) Mathematical Properties of the Chi-square Distribution
- (b) Chi-square Test of Independence
- (c) Chi-square Test of Homogeneity

VII. Rank Correlation and other Measures of Association
- (a) Spearman Rank Correlation Coefficient
- (b) Kendall's Tau
- (c) Kendall's Coefficient of Concordance W

VIII. Procedures that Utilize Data from Three or More Independent Samples
- (a) Extension of the Median Test
- (b) Kruskal-Wallis One-Way Analysis of Variance by Ranks
- (c) Multiple Comparisons

IX. Procedures that Utilize Data from Three or More Related Samples
- (a) Friedman Two-way Analysis of Variance by Ranks
- (b) Multiple- Comparison Procedure for Use with Friedman

X. Optional Topics
- (a) Making Inferences about the Equality of Two Dispersion Parameters
  - Ansari-Bradley Test
- (b) Point Biserial Coefficient of Correlation
- (c) Durbin's Test for Incomplete block designs.
- (d) Cochran's Test for Related Observations
- (e) Test for Normality like Lillliefors test, Kolmorov-Smirnov test, Goodness- of-fit Chi-square test