STAT 3380 Section A01
An Introduction to Nonparametric Analysis
Winter 2020

Time	MWF 12:30 p.m. – 1:20 p.m.
Location	111 Armes
CRN	52555

Instructor	Dr. Zeny Mateo
	319 Machray Hall
	Telephone: 204-474-6707
	Email: Zeny.Mateo@umanitoba.ca

Web Pages	UMLearn: `http://umanitoba.ca/umlearn`
	Statistics: `http://umanitoba.ca/statistics`
	R Download: `https://cran.r-project.org/mirrors.html`
	R Studio Download: `https://www.rstudio.com/products/rstudio/download3/`

Office Hours:	Monday 1:30 p.m. – 2:30 p.m.
	Tuesday 10:30 a.m. – 11:30 a.m.
	Wednesday 1:30 p.m. – 2:30 p.m. (or by appointment)

If the above times are not convenient for you, please call, email or speak to me to arrange an alternate time to meet. I will do my best to return all email or telephone messages within 24 hours.

Evaluation

Quizzes (2)	10%
Project	15%
Midterm Test	25%
Final Examination	50%

Subject to the caveat in the paragraph below, the following are the minimum percentage grades required to receive each of the various letter grades: A$^+$ (90%), A (80%), B$^+$ (75%), B (70%), C$^+$ (65%), C (60%), D (50%).

There is an **additional requirement** for obtaining a C in the course: **to obtain a grade of C or better, you must obtain at least 50% on the final examination**.

Research Project

Part of your assessment for this course will be a submission of a project. This will made up of a research project that will require a research objective, data collection, analysis and summary and interpretation of the results. Further details will be discuss in class.

Exam

The Midterm Test will be held on **Wednesday, March 04, 2020 from 5:00 p.m.– 6:30 p.m. (1.5 hours)** More details will be discussed in class regarding the Midterm Test and Final examination. The final exam will be two (2) hours in duration and will be scheduled by the Student Records Office. **Please note that there will be no deferred test**. In case a student will not be able to write his Midterm test for valid reason, the weight of the Midterm Test will be adjusted to the Final examination.

Quizzes

There will be two (2) short quizzes over the course of the term. The instructor will inform students of the material covered on each quiz at least one week in advance. The quizzes will be given in class on the following tentative dates schedule: **Friday February 07, and Friday March 27**. As much as possible, they will be graded within one week. There will be no make-up quizzes. They will be graded within one week and marks will be posted on the UM Learn Gradebook (see the web link on page 1). There will be no make-up quizzes.

Assignments

There will be no formal assignments in this course. However, numerous practice problems (with solutions) will be posted for each unit. Students are strongly encouraged to try these practice problems on a regular basis.

Software Download

The software R- Studio software will be used sometimes in this course to show the analysis and solutions of some problems. However, the interpretation of the output is the most important thing that we need to understand in this course. So please download the R-Studio program where the link is found in the first page.

Textbook

Applied Nonparametric Statistics by Wayne W. Daniel, second edition, Brooks/ Cole, Duxbury Thompson Learning 1990 IBSN 0 –534 –38194 – 4. A photocopied reprinted version of the textbook is also available in the bookstore of the University of Manitoba.

References

- Practical Nonparametric Statistics by W. J. Conover, Third edition, John Wiley and Sons, Inc. 1999 ISBN 0 471-16068-7

- Nonparametric Statistical Methods by Myles Hollander and Douglas A. Wolfe, Second edition, john Wiley and Sons, 0 - 471 1945

Voluntary Withdrawal

The voluntary withdrawal date is **March 18** (by which time you will have received your marks for the first quiz, and the midterm test).

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 describe academic dishonesty (including plagiarism, cheating, inappropriate collaboration and examination impersonation, as well as typical penalties) can be found at:

`http://umanitoba.ca/science/undergrad/resources/webdisciplinedocuments.html`

Copyrighted Material

All course notes, assignments, tests, exams, practice exams and solutions are the intellectual property of your instructor or the Department of Statistics. Reproduction or distribution of these materials is strictly forbidden without their consent.

Recording of Class Lectures

Your instructor and the University of Manitoba hold copyright over the course materials, presentations and lectures which form part of this course. No audio or video recording of lectures or presentations is allowed in any format, openly or surreptitiously, in whole or in part without permission from your instructor.

Use of Electronics in the Classroom

It is the general University of Manitoba policy that all technology resources are to be used in a responsible, efficient, ethical and legal manner. A student may use technology in the classroom setting only for educational purposes approved by the instructor and/or the University of Manitoba Accessibility Services. Students should not engage in electronic messaging/posting activities (e-mail, texting, video or voice chat, social networking (e.g. Facebook)) or electronic gaming during scheduled class time.

Class Communication

The University requires all students to activate an official University email account. Please note that all communication between your instructor and you as a student must comply with the Electronic Communication with Students Policy. Please see

`http://umanitoba.ca/admin/governance/governing_documents/community/electronic_`
`communication_with_students_policy.html`

You are required to obtain and use your U of M email account for all communication between yourself and the university.

Student Accessibility Services

If you are a student with a disability, please contact SAS for academic accommodation supports and services such as note-taking, interpreting, assistive technology and exam accommodations. Students who have, or think they may have, a disability (e.g. mental illness, learning, medical, hearing, injury-related, visual) are invited to contact SAS to arrange a confidential consultation.

http://umanitoba.ca/student/saa/accessibility/
520 University Centre
204-474-7423
Student_accessibility@umanitoba.ca

ROASS Schedule A

Schedule A of the Responsibilities of Academic Staff with regards to Students (ROASS) policies of the University of Manitoba lists resources and policies for students. It is important that you familiarize yourself with these resources and policies. Schedule A will be posted on your instructor's UMLearn page.

Course Outline

Unit 1 − Introduction

Unit 2 − Review of Basic Statistics

- Some Important Terminology
- Hypothesis testing; Statistical Significance versus Practical Significance, Type I error, Power of the Hypothesis Test; Efficiency of Hypothesis Tests
- Estimation
- Measurement scales: Nominal, Ordinal, Interval and Ratio
- Nonparametric Statistics : History, Advantages and Disadvantages, When to use Nonparametric Procedures.

Unit 3 − Procedures that Utilize Data from a Single Sample

- Making Inferences about a Location Parameter: One– sample Sign Test, Wilcoxon Signed–Rank Test
- Making Inferences about a Population Proportion: Binomial Test
- One–Sample Run Test for Randomness
- Cox–Stuart Test for Trend

Unit 4 – Procedures that Utilize Data from Two Independent Samples

- Making Inferences about the difference between two location parameters: Median Test, Mann–Whitney Test
- Some Miscellaneous Two Sample Tests: Wald–Wolfowitz Runs Test, Fisher Exact Test

Unit 5 – Procedures that Utilize Data from Two Related Samples

- Procedures for Testing Hypotheses about Location Parameters: Sign Test for Two Related Samples, Wilcoxon Matched–Pair Signed Rank Test
- Confidence Interval Procedures for the Median Difference
- Test for Two Related Samples When Data Consists of Frequencies

Unit 6 – Chi–Square Tests of Independence and Homogeneity

- Mathematical Properties of the Chi–square Distribution
- Chi–square Test of of Independence
- Chi–square Test of Homogeneity

Unit 7 – Rank Correlation and other Measures of Association

- Spearman Rank Correlation Coefficient
- Kendall's Tau
- Kendall's Coefficient of Concordance W

Unit 8 – Procedures that Utilize Data from Three or More independent Samples

- Extension of the Median Test
- Kruskall–Wallis One–Way Analysis of Variance by Ranks
- Multiple Comparison

Unit 9 – Procedures that Utilize Data from Three or More Related Samples

- Friedman Two–way Analysis of Variance by Ranks
- Multiple–Comparison Procedure for use with Friedman Test

Unit 10 – Optional Topics (if time permits)

- Making Inferences about the Equality of Two Dispersion Parameters: Ansari– Bradley Test
- Point Biserial Coefficient of Correlation
- Durbin's Test for Incomplete Block Design
- Cochran's Test for Related Observations
- Test for Normality: Lilliefors Test, Kolmorov– Smirnov Test and Goodness–of–Fit Test