Stat 6610 - Applied Nonparametric Statistics

Autumn 2017

Time: MWF 10:20 − 11:15   **Place:** 353 Journalism Building

	Instructor	TA
Email:	karwa.8@osu.edu	jones.5810@osu.edu
Office:	Cockins Hall, Room 205C	Cockins Hall, Room 420
Office Phone:	247-7982	

Office Hours: Monday and Wednesdays, 1:15 2:15 p.m. or by appointment

Main Reference:

1. Hollander, M., Wolfe, D. A., & Chicken, E., Nonparametric Statistical Methods, Third Edition (2014), Wiley.

2. Class lectures and additional material provided in class.

Course Summary: This course serves as an introduction to applied nonparametric statistics. The area of nonparametric statistics is vast, and the term "nonparametric" is used in many different ways. The main focus of this course will be on the use of rank based procedures; these are non-parametric in the sense that they are distribution free and valid under weaker assumptions when compared to parametric procedures. There is of course a loss in power when the parametric assumptions hold. Although this is an applied course, there will be some theory to help understand the core concepts behind rank based procedures. There will also be a computing component to the course. All computing will be done in the open source statistical software R. Some computations will be carried out using hand to illustrate the inner workings of the procedures.

Learning Outcomes: The following are the learning outcomes:

1. Help students develop an understanding of the basic principles of statistical inference.

2. For any given inference procedure, understand the assumptions of the underlying probability model under which inferences are valid.

3. Understand the difference between non-parametric and parametric procedures.

4. Learn a variety of rank based statistical procedures, including a knowledge of when it is appropriate (and inappropriate) to apply a particular inference procedure.

5. Understand the relation between hypothesis tests, confidence intervals and point estimates in the context of nonparametric inference.

6. Learn the concept of asymptotic relative efficiency and large sample approximations.

Prerequisites: Stat 5301, 6201, or 6302, or equivalent, or permission of instructor.

Tentative Course Outline:

1. Review of basic concepts from classical (parametric) statistics, and comparison with the nonparametric approach (1.1 - 1.6 and supplemental material)

2. The dichotomous data problem (2.1 - 2.3)

3. Sign test procedures for the one-sample location problem and for paired replicates data; asymptotic relative efficiency (3.4, 3.5, 3.6, 3.8, 3.11)

4. Signed rank procedures for the one-sample location problem and for paired replicates data (3.1, 3.2, 3.3, 3.7, 3.11)

5. The two-sample location problem (4.1, 4.2, 4.3, 4.5)

6. Kolmogorov-Smirnov two-sample test for general differences (5.4)

7. The one-way layout; multiple comparisons procedures (6.1, 6.2, 6.5, 6.7, 6.8)

8. Kendall's Tau procedures for the independence problem (8.1, 8.2)

9. The two-Way layout (7.1, 7.2, 7.3, 7.4, 7.5)

Note: If time permits, we may cover some additional topics such as bootstrapping and randomization based inference. Also, quite occasionally, material from outside the textbook will be covered in lecture. You are responsible for all the material presented in lecture. Also note that the order in which the material is covered is subject to change, depending on the class requirements.

Grading Policy (Tentative):

Homework and quizzes	(20%)
Midterm 1	(20%)
Midterm 2	(20%)
Final	(40%).

The grading policy is subject to change

Important Dates:

Midterm #1 .... TBA
Midterm #2 .... TBA
Final Exam .... Tuesday, Dec 12, 10:00 to 11:45 in the usual meeting room

Course Policy:

1. No "early" final exams or make-up exams will be given, so make your travel plans accordingly.

2. Use of personal computers, cell phones, etc. is prohibited during lecture. Please do not read the newspaper or other extraneous materials during lecture.

3. The class will involve a lot of discussions and active class participation is expected from all students.

4. Homework will be due at the start of class; please do not work on the homework during lecture.

5. No late home work will be accepted, unless a prior arrangement has been made with the instructor. Late submissions will result in a 0 grade.

6. The course policy is subject to change.

Attendance Policy: In accordance with University Rules, a student who is absent from three or more (not necessarily consecutive) classes, without contacting the instructor with a valid excuse, may be reported for possible disenrollment. To prevent disenrollment, the instructor should be contacted (e-mail: karwa.8@osu.edu) within 24 hours of the third (and any subsequent) absence.

Academic Misconduct: It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term academic misconduct includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct http://studentlife.osu.edu/csc/.

Disability Services: Students with disabilities (including mental health, chronic or temporary medical conditions) that have been certified by the Office of Student Life Disability Services will be appropriately accommodated and should inform the instructor as soon as possible of their needs. The Office of Student Life Disability Services is located in 098 Baker Hall, 113 W. 12th Avenue; telephone 614- 292-3307, slds@osu.edu; slds.osu.edu.