UTD	**Course**	**STAT 7334.001 Nonparametric and Robust Statistical Methods**
	Professor	Frank Konietschke
	Term	Fall 2016
	Class Sessions	MW 10:00 – 11.15 am, CB3 1.308

Professor's Contact Information

Office Location, Phone	FO 2.601A, 972-883-6439 [*Do not leave messages here – use email instead*.]
Email Address	fxk141230@utdallas.edu
Website	www.utdallas.edu/~fxk141230
Office Hours	MW 4pm - 5pm or by appointment
Method of Contact	I check *email* regularly. Please communicate by email.

General Course Information

Prerequisites	*STAT 6331* or the equivalent **(this is *firm***), and daily checking of UTD email account for receipt of messages and materials sent by the instructor by email.
Course Description	*Tentative Topics to be Covered*: Order Statistics. The ``Equal in Distribution" Technique. Distribution-Free Statistics. Count Statistics. Rank Statistics. Statistics using Both Counting and Ranking. Permutation Tests. Basic Theory of U-Statistics. Asymptotically Nonparametric Distribution-Free Statistics. Power Functions and their Properties. Nonparametric Alternatives. Pitman Asymptotic Relative Efficiency and Efficacy of Tests. Efficacies and A.R.E. in Location Testing Problems. Distribution-Free Confidence Intervals. Hodges-Lehmann Estimates and their Properties. Linear Rank Statistics and their Asymptotic Null Hypothesis Distribution Theory. Locally Most Powerful Tests for the Two-Sample Location and Scale Problems and for General Regression Alternatives. Asymptotic Power of LMP Tests for Regression Alternatives. LMP Rank Tests and Asymptotic Properties for the One-Sample Location Problem. Conditional Nonparametric Distribution-Free Tests. Bootstrap Methods. Estimation for Nonparametric Families. Notions of Breakdown Point. Robust Statistics: History, Concepts, Methods. Robust Estimation: Methods, Stability Aspects, Jackknifing, Studentization. Robust Statistical Models: Formulation Issues, Estimation Criteria, Bias
Desired Learning Outcomes	A working knowledge of *nonparametric statistical methods*, which are designed to analyze data without relying on specification of an underlying parametric model, and *robust statistical methods*, which are designed to analyze data from a specified parametric model while minimizing the undue influence of contamination and outliers.
Required Text	Boos, D. D. and Stefanski, L. A., *Essential Statistical Inference: Theory and Methods*, 2013, Springer. **Free e-book access via UTD Library.**
Other Materials	Handouts and assigned or recommended readings.
Some Additional Sources	Davison, A. C. and Hinkley, D. V., *Bootstrap Methods and their Application*, Cambridge University Press, 1997 Efromovich, S., *Nonparametric Curve Estimation*, Springer, 1999 (**Free e-book access via UTD Library**) Hettmansperger, T. P. and McKean, J. W., *Robust Nonparametric Statistical Methods*, Wiley, 1998 Haerdle, W., *Applied Nonparametric Regression*, Cambridge University Press, 1990 Hampel, F. R., Ronchetti, E. M., Rousseeuw, P. J., Stahel, W. A., *Robust Statistics: The Approach Based on Influence Functions*, Wiley, 1986 Huber, P. J. and Ronchetti, E. M., *Robust Statistics*, 2nd Edition, Wiley, 2009 Jurečková, J. and Picek, J., *Robust Statistical Methods with R*, Chapman and Hall, 2006 Jurečková, J. and Sen, P. K., *Robust Statistical Procedures: Asymptotics and Interrelations*, Wiley, 1996 Maronna, R. A., Martin, R. D., and Yohai, V. J., *Robust Statistics: Theory and Methods*, Wiley, 2006 Owen, A. B., *Empirical Likelihood*, Chapman and Hall, 2001 Randles, R. and Wolfe, D. A., *Introduction to the Theory of Nonparametric Statistics*, Wiley, 1979 Rousseeuw, P. J. and Leroy, A. M., *Robust Regression and Outlier Detection*, Wiley, 1987 Serfling, R. J., *Approximation Theorems of Mathematical Statistics*, Wiley, 1980 Staudte, R. G. and Sheather, S. J., *Robust Estimation and Testing*, Wiley, 1990

Syllabus (subject to revision)

M 8/22	Setting of nonparametric and robust inference.
W 8/24	Nonparametric families of distributions. "Equal in Distribution" technique.
M 08/29	Distribution-free statistics. Counting methods.
W 08/31	Rank Statistics, Estimation methods
M 9/5	**University Closed**
W 9/7	Asymptotic normality of rank statistics, the Hajek-Projection
M 9/12	Wilcoxon-Mann Whitney test
W 9/14	Several sample methods
M 9/19	Kruskal-Wallis test
W 9/21	Jonckheere Terpstra test and applications
M 09/26	The ANOVA type statistic
W 09/28	Nonparametric distribution-free confidence intervals. Hodges-Lehmann estimators.
M 10/3	Bootstrap methods.
W 10/5	Permutation tests and studentized permutation tests
M 10/10	Permutation tests for general linear models
W 10/12	Two dependent samples
M 10/17	Nonparametric correlation
W 10/19	General Repeated Measures Designs
M 10/24	Resampling Methods for General RM and multivariate designs
W 10/26	Clustered data
M 10/31	Clustered data II
W 11/2	TBA
M 11/7	TBA
W 11/9	TBA
M 11/14	TBA
W 11/16	TBA
M 11/21	☺ ***Fall Break – University Closed*** ☺
W 11/23	☺ ***Thanksgiving Holiday – University Closed*** ☺
M 11/28	***Student Presentations***
W 11/30	***Student Presentations***
M 12/5	***Student Presentations***
W 12/7	***Student Presentations***

Course Policies

Grading Criteria	The course grade will be based on *class participation* (50%) and *mini-symposium presentations* (50%). Class participation will consist of attendance, raising questions, and presentation of assigned short exercises (including verifications of steps of proofs). The course will conclude with a mini-symposium. This will consist of *15-minute slide presentations* on assigned research papers in nonparametric and robust statistics and will draw upon the topics covered in the course. The presentations will be delivered in class and also sent to the class in electronic form.
Student Conduct and Discipline	The University of Texas System and The University of Texas at Dallas have rules and regulations for the orderly and efficient conduct of university business. It is the responsibility of each student to be knowledgeable about those which govern student conduct and activities. General information on student conduct and discipline is contained in the UTD publication, *A to Z Guide*, provided to all registered students.
Academic Integrity	The faculty expects from students a high level of responsibility and academic honesty. Because the value of an academic degree depends upon the absolute integrity of the work done by the student, each student must demonstrate a high standard of individual honor in his or her scholastic work. Scholastic dishonesty includes, but is not limited to, statements, acts, or omissions that are related to the submission as one's own work of material that is not one's own. This may include cheating, plagiarism, collusion, and falsifying of academic records. Students suspected of academic dishonesty are subject to disciplinary proceedings.
Email and Technical Support	UTD encourages faculty to consider email from students official only if it originates from a UTD student account. This allows UTD to maintain a high degree of confidence in the identity of all individuals corresponding and in the security of the transmitted information. UTD furnishes each student with a free email account and provides a method for students to forward their UTD email to other accounts. Assistance is available via assist@utdallas.edu or the UTD Computer Helpdesk at 972-883-2911.
Withdrawal	Deadlines for withdrawal from courses are published in each semester's course catalog. A faculty member cannot drop or withdraw a student. Rather, it is the student's responsibility to handle withdrawal procedures from any class. The proper paperwork and procedure must be used to avoid receiving a final grade of "F" in a course in which the student remained enrolled but did not participate.
Incomplete Grades	As per university policy, incomplete grades are granted only in the case of work unavoidably missed (and excused) by the semester's and not already covered by the professor's policy on missed work or activities, and only if 70% of the course work has been completed. An incomplete grade must be resolved within eight weeks from the first day of the subsequent long semester. If the required work to complete the course and to remove the incomplete grade is not submitted by the specified deadline, the incomplete grade becomes changed automatically to the grade of F.
Disability Services	Disability Services seeks to provide students with disabilities educational opportunities equivalent to those of their non-disabled peers. The Office of Disability Services is located in room 1.610 in the Student Union, and its hours are Monday and Thursday, 8:30 a.m. to 6:30 p.m.; Tuesday and Wednesday, 8:30 a.m. to 7:30 p.m.; and Friday, 8:30 a.m. to 5:30 p.m. Essentially, the law requires colleges and universities to make reasonable adjustments necessary to eliminate discrimination on the basis of disability. For example, it may be necessary to remove classroom prohibitions against tape recorders or animals (in the case of dog guides) for students who are blind. Occasionally, an assignment requirement may be modified (for example, a research paper versus an oral presentation for a student who is hearing impaired). Classes including students with mobility impairments may have to be

	rescheduled in accessible facilities. The college or university may need to provide special services such as registration, note-taking, or mobility assistance. It is the student's responsibility to notify his or her professors of the need for such accommodations. Disability Services provides students with letters to present to faculty members.
Religious Holy Days	The University of Texas at Dallas excuses students from class or other r required activities for the purpose of travel to and observance of a religious holy day for a religion whose places of worship are exempt from property tax under Section 11.20, Tax Code, Texas Code Annotated. In the case of such an absence, the student is encouraged to notify the instructor as soon as possible, preferably in advance. Regarding missed assignments, quizzes, tests, or exams, the student excused for such a purpose will be covered by the professor's policy for missed or late work.
Copyright Notice	The U. S. copyright law (Title 17, United States Code) governs the making of photocopies or other reproductions of copyrighted materials, including music and software. Copying, displaying, reproducing, or distributing copyrighted works may infringe the copyright owner's rights and is subject to appropriate disciplinary action as well as criminal penalties provided by federal law. Usage of such material is only appropriate when that usage constitutes "fair use" under the Copyright Act. As a UT Dallas student, you are required to follow the institution's copyright policy (Policy Memorandum 84-I.3-46). For more information, see http://www.utsystem.edu/ogc/intellectualproperty/copypol2.htm.

The descriptions and timelines contained in this syllabus are subject to change at the discretion of the Professor.