

Syllabus

Course: Psychometrics, MTMT 6971-01 (58563)
Semester: Spring 2014 Academic Semester
Credit Hrs: 3
Prerequisites: Permission of Instructor
Instructor: Michael J. Kalsher
Office: 301-F Carnegie Bldg.
Contact: kalshm@rpi.edu; 276-8267. Course materials: Kalsher.com
Office Hrs: Mondays/Thursdays 12 (noon) – 2:30 p.m. or by appt.
Class Mtgs: Wednesday, 2:00 – 4:50 p.m., PITTS 5216
TA Info: TBA

Course Description, Objectives and Content

This course provides an introduction to basic methods of psychological research, including experimental design, data collection and analysis, and communication of results. Students will be evaluated through three in-class exams, regularly assigned problem sets, and a semester-long data collection project. For the data collection project, each student will be expected to design and carry out an experiment or design/administer a survey and then write up the results in APA (American Psychological Association) format. Topics covered in class will include research design and methodology and a wide variety of both parametric (regression, ANOVA) and non-parametric (chi-square, Mann-Whitney U, Wilcoxon T, Kruskal-Wallis, Friedman's) statistical procedures. Data analysis will be carried out primarily using SPSS, but students will also gain an introduction to the open source “R”. A tentative schedule of topics by day/date is provided.

Texts/Software

Required:

Field, A. (2013). *Discovering Statistics Using IBM SPSS Statistics* (4th Edition). London: Sage Publications.

IBM[®] SPSS[®] *Statistics Standard GradPack 21 (for Windows or Mac)*. Available from <http://www.onthehub.com/spss/>

This software package includes SPSS Base, SPSS Regression and Advanced Models. Make sure you get the Graduate Pack, not the other SPSS products. You will need to license the Graduate Pack for either 6-months or 1-year. We will make extensive use of SPSS during the lab sessions, for the problem sets and for the required data collection project. You should install this SPSS package on your laptop, and bring your laptop to class.

Course Policies

Attendance & Participation

Attendance and participation in this class are very important. Much of the important work that you will do for the course will take place during our regular class meetings, both in the lecture and lab sessions. Plan to attend all of them. If you must miss class for a legitimate reason, you should contact me prior to missing class by e-mail or in-person during my office hours. The topics covered each day will be clearly outlined in the course schedule, so check there regularly to ensure that you are prepared for class on any given day.

Academic Honesty

Student-teacher relationships are built on trust. Students must trust that teachers have made appropriate decisions about the structure and content of the courses they teach; teachers must trust that the assignments students turn in are their own work. Acts that violate this trust undermine the educational process. The Rensselaer Handbook defines various forms of academic dishonesty and the procedures for responding to them. All forms are violations of the trust between students and teachers. Please familiarize yourselves with this portion of the Rensselaer Handbook and note that the penalties for cheating can be quite harsh.

In this class, you will be assigned a number of problem sets. You are encouraged to consult with other class members about general statistical issues and procedures, operation of statistical software, etc., but you are **EXPECTED TO WORK INDIVIDUALLY ON ALL PROBLEM SETS**. All analyses and write-ups should be your independent work.

Problems will be sufficiently open-ended that identical solutions or write-up language (especially if the results are incorrect!) will be viewed as possible plagiarism. To be formal about it, plagiarism means passing off the statistical designs, software commands, or written results of others as one's own work. A single plagiarized assignment may result in your being assigned a grade of "F" for the course.

Assignments

You must complete all major assignments. If you do not submit all materials for each problem set, you will not receive a passing grade. Graduate student assignments will differ somewhat from undergraduate student assignments, but most of the problem sets will be identical. Graduate students will be expected to complete more advanced work, likely related to their directed research projects, theses, or dissertations. In particular, graduate students will be expected to prepare a fully realized multivariate analysis of an actual data set, and present the results in a term paper.

Late Work

You should submit your work on time. Due dates and times will be announced in class (another reason for regular attendance). Late work will only be accepted if you consult with me prior to the day in which the work is due, or present an official medical or Dean of Student's excuse. Late work, if unexcused, will incur a penalty of 5% reduction/day.

Grading

Each of the graded assignments (exams, problem sets, data collection project) will be graded on a 0-100 scale. The semester grade will be the average of the grades for all problem sets. Semester grades are on a +/- scale. If at any time during the semester you are concerned about your grade in the course or on a specific problem set, talk with me. Last minute arguments about grades at the end of the semester will usually go in my favor because I will keep careful records of your progress. You should do this as well.

<i>Date</i>	<i>Class Topic</i>	<i>Readings</i>	<i>Lab</i>
<i>Wednesday Jan. 22</i>	Introduction.	Field, Chapter 1, Field, Chapter 2: “Everything you never wanted to know about statistics.”	
<i>Wednesday Jan. 29</i>	Research Design	Field, Chapter 2: “Everything you never wanted to know about statistics.”	
<i>Wednesday Feb. 5</i>	Data handling practices; <i>Learning graphing techniques; Defining, spotting and reducing bias</i>	Field, Chapter 3, “The IBM SPSS Statistics Environment”, Field, Chapter 4, “Exploring Data with Graphs”; Chapter 5, “The Beast of Bias.”	Lab 1 Data Screening and graphing
<i>Wednesday Feb. 12</i>	Non-parametric models	Field, Chapter 6, “Non-parametric models”	Lab 2 Non-parametric procedures Problem Set #1
<i>Wednesday Feb. 19</i>	Bivariate distributions; covariance; correlation; partial/semi-partial correlation	Field, Chapter 7, “Correlation”	Lab 3 Correlations EXAM 1
<i>Wednesday Feb. 26</i>	Simple Regression. Testing systems of hypotheses. Confounds and Controls. Multivariate Research Designs	Field, Chapter 8, “Regression”	Lab 4 Simple regression using SPSS
<i>Wednesday Mar. 5</i>	Introduction to multiple regression; simultaneous, hierarchical (sequential), and stepwise regression. When to use each type and when not to	Handouts TBA	Lab 5 Multiple regression Problem Set #2
<i>Wednesday Mar. 12</i>	Spring Break, no classes		
<i>Wednesday Mar. 19</i>	Introduction to the t-test (one-sample; paired-samples; independent-samples). GLM: The relationship between ANOVA and Regression. One-way ANOVA (between-subjects; repeated-measures) The importance of follow-up tests.	Field Chapter 9, “Comparing two means” Field, Chapter 11, “Comparing Several Means: ANOVA-GLM 1”	Lab 6 The t-test One-way ANOVA
<i>Wednesday Mar. 26</i>	Analysis of Covariance Factorial ANOVA	Field, Chapter 12, “ANCOVA-GLM 2” Field, Chapter 13, “Factorial ANOVA-GLM 3”	Lab 7 ANCOVA Factorial ANOVA Problem Set #3
<i>Wednesday Apr. 2</i>	No new material	No new readings	EXAM 2
<i>Wednesday Apr. 9</i>	Repeated-measures ANOVA	Field, Chapter 14, “Repeated-measures designs-GLM 4”	Lab 8 Repeated-measures ANOVA Problem Set #4

<i>Date</i>	<i>Class Topic</i>	<i>Readings</i>	<i>Lab</i>
<i>Wednesday Apr. 16</i>	Mixed design ANOVA Multivariate ANOVA Multiple Dependent Variables	Field, Chapter 15, “Mixed design ANOVA-GLM 5” Field, Chapter 16 “Multivariate Analysis of Variance (MANOVA)”	Lab 9 Mixed-model ANOVA MANOVA
<i>Wednesday Apr. 23</i>	Exploratory factor analysis and discriminant analysis – finding variables that discriminate among nominal categories.	Field, Chapter 17, “Exploratory factor analysis”	Lab 10 Exploratory factor analysis and discriminant analysis Problem Set #5
<i>Wednesday Apr. 30</i>	Categorical data. Using chi-square and loglinear analysis Logistic Regression	Field, Chapter 18, “Categorical data” Field, Chapter 19, “Logistic Regression”	Lab 11 Analyzing categorical data Doing logistic regression
<i>Wednesday May 7</i>	No New Material	No New Readings	EXAM 3 Data Collection Project Write-up Due at 5 p.m.