

**Tufts University, Friedman School of Nutrition Science and Policy**

NUTB350 – Statistical Methods for Health Professionals II

Spring 2018

Updated on 1/15/2018

Class Meetings: Residency sessions during January 2018

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Yue Huang

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Office hours: TBA

**TA duties and responsibilities**

Amy and Caroline will share tutoring and grading responsibilities.

Graduate Credits: 1.0

Prerequisites: NUTB250 or equivalent and permission of the instructor.

**Course Description:**

This course is part two of a one-year, two-semester course sequence in statistics. The course covers experimental and non-experimental research designs, multiple linear regression, multiple logistic regression, polytomous logistic regression, analysis of variance, analysis of covariance, non-linear functional forms, heteroskedasticity, complex surveys, cluster randomized trials, and how these tools are used in the fields of nutrition science and policy. Students will make extensive use of Stata statistical analysis software and learn how to analyze a dataset and report the results in tables, figures and text.

**Course Objectives:**

Students will learn how to conduct and interpret the most important intermediate level bioscience and social science statistical tests. The overall goal of the course is for students to be able to independently analyze a simple dataset with Stata software and report the results in tables, figures and text.

**Texts or Materials:** Many of the readings are accessible from the internet at no additional cost. Course lectures and study materials can be found on the course website on Trunk.

E. Vittinghoff, D.V. Glidden, S.C. Shiboski, and C.E. McCulloch. Regression Methods in Biostatistics: Linear, Logistic, Survival, and Repeated Measures Models, 2nd edition. Springer, 2012.

This text is relatively inexpensive (about \$73.20 for the hardcover book, or \$0.00 for the E-book). Because Tufts has a site license with Springer, the publisher, students may read the text online for free. The link is: <http://library.tufts.edu/record=b2431675~S1>

*Statistics at Square Two, Michael J. Campbell, Wiley-Blackwell; 2 edition, ISBN-10: 1405134909, ISBN-13: 978-1405134903*

Errata for Statistics at Square Two...

<http://www.shef.ac.uk/content/1/c6/04/68/32/Statistics%20at%20Square%20Two.pdf>

Lawrence C. Hamilton	Statistics with STATA: Version 12, 8th Edition will be used unless the 9 <sup>th</sup> edition is ready by the Spring 2016	ISBN-10: 0840064632 ISBN-13: 9780840064639	Optional
Michael J. Campbell	Statistics at Square Two, 2 <sup>nd</sup> edition (SS2)	ISBN-10: 1405134909, ISBN-13: 978-1405134903	Required
E.Vittinghoff, D.V.Glidden, S.C. Shiboski, and C.E. McCulloch.	Regression Methods in Biostatistics: Linear, Logistic, Survival, and Repeated Measures Models, 2nd edition. Springer. (RMIB)	<a href="http://library.tufts.edu/record=b2431675~S1">http://library.tufts.edu/record=b2431675~S1</a>	Required (online version is free)

Stata IC version 15 is required for this course. Most students will have purchased it when they take NUTB250.

**Academic Conduct:** Each student is responsible for upholding the highest standards of academic integrity, as specified in the Friedman School's Policies and Procedures manual (<http://nutrition.tufts.edu/student/documents>) and Tufts University policies

### **Academic Conduct**

Academic integrity, including avoiding plagiarism, is critically important. Each student is responsible for being familiar with the standards and policies outlined in the Friedman School's *Policies and Procedures* manual (<http://nutrition.tufts.edu/student/documents>). It is the responsibility of the student to be aware of, and comply with, these policies and standards. In accordance with Tufts University's policy on academic misconduct, violations of standards of academic conduct will be sanctioned by penalties ranging from grade reduction or failure on an assignment; grade reduction or failure of a course; up to dismissal from the school, depending on the nature and context of any infraction. <http://uss.tufts.edu/studentAffairs/documents/TuftsStudentHandbook.pdf>.

It is the responsibility of each student to understand and comply with these standards as violations will be sanctioned by penalties ranging from failure on an assignment and the course to dismissal from the school.

**Classroom Conduct:** Students are required to attend the residency period class sessions and Stata lab sessions.

### **Assessment and Grading:**

Weekly comprehension quizzes will test the material learned from the online lessons. Exam 1 will be during week 5 and exam 2 will be during week 11. A Data Analysis project report will be due at the end of the semester. It will be assigned on March 8. The report should be a maximum of 8 pages long, including all figures and tables.

*Quiz average 15%*

*Exam average 30%*

*Homework Average 25%*

*Data Analysis project 30%*

*Assignment of letter grades:*

97+ A+

94-96. 999 A  
90-93. 999 A-  
87-89. 999 B+  
84-86. 999 B  
80-83. 999 B-  
77-79. 999 C+  
74-76. 999 C  
70-73. 999 C-  
Etc.

**Assignments and Submission Instructions:**

Assignments received after their deadline will not be accepted or graded unless an extension is approved in advance. Students who are unable to complete an assignment on time for any reason should notify the instructor by email or phone call prior to the deadline, with a brief explanation for why the extension is needed.

**Accommodation of Disabilities:** Students with documented disabilities are entitled to academic accommodation appropriate to their needs. If you require accommodations for this course, please contact me confidentially prior to the end of the second week of classes.

The ethics in research training is a program requirement for graduation and should be completed by the end of the spring semester of the first year of graduate study. You must complete the training before collecting or analyzing data from human subjects. Please submit a copy of the certificate to the Office of Student Affairs when you complete the training (\* see below).

# 2018

January						
S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

February						
S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28			

March						
S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

April						
S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

May						
S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

June						
S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

**Course Schedule and assignments:** This schedule is subject to modification at the instructor's discretion.

DATE(S) & LOCATION(S)	TOPIC OR CLASS TITLE	ASSIGNMENTS & ACTIVITIES	LECTURER(S)
Week 1  Online 1/18-1/21	Ethics in Research CITI Training	Online CITI IRB Ethics tutorial * <a href="https://www.citiprogram.org/default.asp?language=english">https://www.citiprogram.org/default.asp?language=english</a> (tutorial)  More details about IRB training ... <a href="http://www.tufts.edu/central/research/IRB/HumanEducation.htm">http://www.tufts.edu/central/research/IRB/HumanEducation.htm</a>  Please get started on readings for module 1 and residency period	
Week 2  Online 1/22-1/28	Multiple logistic regression analysis and polytomous logistic regression analysis	Read chapter 3 in SS2 Read chapter 5 in RMIB  Optional reading: "Logistic Regression" at ...  <a href="http://people.umass.edu/biep640w/pdf/5.%2">http://people.umass.edu/biep640w/pdf/5.%2</a>	Robert Houser

		<p><a href="#">0%20Logistic%20Regression%202014.pdf</a></p> <p>Optional reading: Bringing balance and technical accuracy to reporting odds ratios and the results of logistic regression analyses, by Jason W. Osborne  <a href="http://pareonline.net/pdf/v11n7.pdf">http://pareonline.net/pdf/v11n7.pdf</a></p> <p>View online lesson # 1 &amp; take online quiz by 1/29</p>	
Week 3 Residency 1/29-2/4	Topic I: Multiple Linear Regression  Review of Stata programming	Read chapters 1 and 2 in SS2  In-class Stata review exercise  Homework # 1 assigned	Robert Houser
Week 3 Residency 1/29/-2/4	Topic II: Interpreting regression coefficients  Intermediate Stata programming	Optional reading: "Regression and Correlation" at ... <a href="http://people.umass.edu/biep640w/pdf/2.%20%20Regression%20and%20Correlation%202014.pdf">http://people.umass.edu/biep640w/pdf/2.%20%20Regression%20and%20Correlation%202014.pdf</a>  Read ... Rescaling continuous predictors in regression models .. At .. <a href="http://stattips.blogspot.com/2009/08/rescaling-continuous-predictors-in.html">stattips.blogspot.com/2009/08/rescaling-continuous-predictors-in.html</a>	Robert Houser
Week 4 Online 2/5-2/11	Multiple regression assumptions	Start Reading Chapter 4 in RMIB  View online lesson and take quiz #2 by 2/11  HW1 will be assigned on Tuesday, Jan. 31 and due on February 11	Robert Houser
Week 5 Online 2/12-2/18	Assessing distributional normality and transforming variables	Finish reading Chapter 4 in RMIB  View online lesson & take online quiz #3 by 2/18 Exam 1 will be available on 2/17 and due on 2/20	Robert Houser

<p>Week 6</p> <p>Online 2/19-2/25</p>	<p>Building statistical models, dummy variables and interaction terms</p>	<p>Read “Practical Guidelines for Accurate Statistical Model Building”, by Karen Grace-Martin <a href="http://www.theanalysisfactor.com/7-guidelines-model-building/">http://www.theanalysisfactor.com/7-guidelines-model-building/</a></p> <p>View online lesson &amp; take online quiz #4 on 2/25</p>	<p>Robert Houser</p>
<p>Week 7</p> <p>Online 2/26-3/4</p>	<p>Presenting statistical results in tables, figures and text</p>	<p>Read: “Almost Everything You Wanted to Know About Making Tables and Figures” at <a href="http://abacus.bates.edu/~ganderso/biology/resources/writing/HTWtablefigs.html">http://abacus.bates.edu/~ganderso/biology/resources/writing/HTWtablefigs.html</a></p> <p>Read: “APA tables and figures 1” at ... <a href="http://owl.english.purdue.edu/owl/resource/560/19/">http://owl.english.purdue.edu/owl/resource/560/19/</a></p> <p>View online lesson &amp; take online quiz #5 by 3/4</p> <p>Homework # 2 assigned</p>	<p>Robert Houser</p>
<p>Week 8</p> <p>Online 3/5-3/11</p>	<p>Multi-factor Analysis of variance</p>	<p>Read: “Multi-Factor Analysis of Variance”, by Gerard E. Dallal, Ph.D. <a href="http://www.jerrydallal.com/LHSP/anova2.htm">http://www.jerrydallal.com/LHSP/anova2.htm</a></p> <p>Read: “Multi-Factor Between-Subjects Designs”, by David M. Lane. Available at <a href="http://onlinestatbook.com/2/analysis_of_variance/multiway.html">http://onlinestatbook.com/2/analysis_of_variance/multiway.html</a></p> <p>View online lesson &amp; take online quiz #6 by 3/11</p> <p>Homework # 2 due</p> <p>Data Analysis project will be assigned on 3/12</p>	<p>Robert Houser</p>
<p>Week 9</p> <p>Online 3/12-3/18</p>	<p>Repeated measures analysis of variance and mixed-design ANOVA</p>	<p>Read: “Repeated measures ANOVA” at ... <a href="https://statistics.laerd.com/statistical-guides/repeated-">https://statistics.laerd.com/statistical-guides/repeated-</a></p>	<p>Robert Houser</p>

		<p><a href="#">measures-anova-statistical-guide.php</a></p> <p>Read: Chapter 7 in RMIB</p> <p>View online lesson &amp; take online quiz #7 by 3/18</p> <p>Homework #3 assigned</p>	
<p>Week 10</p> <p>Online 3/19-3/25</p>	<p>Analysis of covariance</p>	<p>Read: "Analysis of Covariance" at ...</p> <p><a href="http://www-psychology.concordia.ca/fac/kline/601/owen.pdf">http://www-psychology.concordia.ca/fac/kline/601/owen.pdf</a></p> <p>View online lesson &amp; take online quiz #8 by 3/25</p> <p>Homework # 3 due</p>	<p>Robert Houser</p>
<p>Week 11</p> <p>Online 3/26-4/1</p>	<p>Analysis of complex surveys</p>	<p>Read:<a href="https://www3.nd.edu/~rwilliam/stats2/SvyCautions.pdf">https://www3.nd.edu/~rwilliam/stats2/SvyCautions.pdf</a></p> <p>Briefly skim: <a href="http://www.stata.com/manuals/13/svy.pdf">http://www.stata.com/manuals/13/svy.pdf</a></p> <p>Watch:<a href="http://www.youtube.com/watch?v=XYjWCL7IEKU">http://www.youtube.com/watch?v=XYjWCL7IEKU</a></p> <p>Watch:<a href="http://www.youtube.com/watch?v=0DRXnoR-Q1c">http://www.youtube.com/watch?v=0DRXnoR-Q1c</a></p> <p>View online lesson &amp; take online quiz #9 by 3/31</p> <p>Exam # 2 (4/1 – 4/4)</p>	<p>Robert Houser</p>
<p>Week 12</p> <p>Online 4/2-4/8</p>	<p>Cluster randomized trials</p>	<p>Read: "Advanced Statistics: Statistical Methods for Analyzing Cluster and Cluster-randomized Data, by Robert L. Wears at ... <a href="http://onlinelibrary.wiley.com/doi/10.1197/aemj.9.4.330/pdf">http://onlinelibrary.wiley.com/doi/10.1197/aemj.9.4.330/pdf</a></p> <p>Read: "Analysis of a cluster-randomised trial in education" <a href="http://www-users.york.ac.uk/~mb55/clust/inctent.htm">http://www-users.york.ac.uk/~mb55/clust/inctent.htm</a></p> <p>Read: "Daily use of Sprinkles micronutrient powder for 2</p>	<p>Robert Houser</p>

		<p>months reduces anemia among children 6 to 36 months of age in the Kyrgyz Republic: a cluster-randomized trial." <a href="#">Lundeen E</a>, <a href="#">Schueth T</a>, <a href="#">Toktobaev N</a>, <a href="#">Zlotkin S</a>, <a href="#">Hyder SM</a>, <a href="#">Houser R.</a>, <a href="#">Food Nutr Bull.</a> 2010 Sep;31(3):446-60. <a href="http://www.ncbi.nlm.nih.gov/pubmed/20973465">http://www.ncbi.nlm.nih.gov/pubmed/20973465</a></p> <p>View online lesson &amp; take online quiz #10 by 4/8</p>	
<p>Week 13 Online 4/9-4/15</p>	<p>Study design and selection of appropriate statistical methods</p>	<p>Read: "Some Aspects of Study Design", by Gerard E. Dallal, Ph.D. <a href="http://www.jerrydallal.com/LHSP/STUDY.HTM">http://www.jerrydallal.com/LHSP/STUDY.HTM</a></p> <p>Read BMJ article ... "Study design and choosing a statistical test" <a href="http://www.bmj.com/about-bmj/resources-readers/publications/statistics-square-one/13-study-design-and-choosing-statisti">http://www.bmj.com/about-bmj/resources-readers/publications/statistics-square-one/13-study-design-and-choosing-statisti</a></p> <p>View online lesson &amp; take online quiz # 11 by 4/15</p> <p>Data analysis project report due on 5/4</p>	<p>Robert Houser</p>