Course Time and Location
January 18, 2018 to May 11, 2018

Lecture Times: Monday, 1:30-3pm, Jaharis 118
Lab Times: Thursday, 1:30-3pm, Sackler 514
Exception: 1/18 in Jaharis 118; 1/25 in Conference Room, 35 Kneeland St. 8th floor conference room; 2/22 in Jaharis 118; 4/19 in TBD; 4/26 in TBD; 5/7 in TBD.
*These locations may be updated

Course Faculty
Course Director: Farzad Noubary, PhD
E-mail: fnoubary@tuftsmedicalcenter.org
Office: 35 Kneeland St, 10th Floor, Room 1004A
Phone: 617-636-4562
Office hours: by appointment

Lab Instructor: Angie Mae Rodday, PhD, MS
E-mail: arodday@tuftsmedicalcenter.org
Office: 35 Kneeland St, 10th Floor, Room 1009
Phone: 617-636-7193
Office hours: by appointment

Teaching Assistant
David Fei
E-mail: david.fei@tufts.edu
Office hours: TBD

Course Information
Credit/s: 1.0
Grading Option: A-F
Prerequisites: NUTR 0206: Biostatistics I

Course Description
This course examines statistical methods for nutrition research, focusing on regression methods for continuous, binary, count and survival data. Emphasis is on developing a conceptual understanding of the application of these techniques to solving problems and to cogently summarize the results, rather than numerical details.

Course Objectives
Upon successful completion of the course students should be able to:
• Analyze continuous outcomes using multiple linear regression models
• Use logistic regression to investigate and test associations with binary outcomes
• Apply survival modeling methods for censored and time-to-event analyses
• Apply repeated measures methods for longitudinal data
• Use statistical software (R) to analyze data

**Course Texts and Materials**
• Lecture notes and other material will be posted on Trunk.

**Classroom Conduct**
• Attend all classes and statistical computing lab sessions.
• Read assigned materials prior to class and actively participate in class discussions.
• Demonstrate an understanding of the use of statistics on assignments, quizzes, and examinations.
• Demonstrate the ability to use statistical programming in analyzing data.

**Assessment and Grading**
Grading is based on the following assessments:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Class Participation</td>
<td>5%</td>
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<tr>
<td>Homework (n=5)</td>
<td>30%</td>
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<tr>
<td>Quizzes (n=2)</td>
<td>40%</td>
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<tr>
<td>Final Project</td>
<td>25%</td>
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**Assignments and Submission Instructions:** Homework is due at 5:00 PM on the given date and should be uploaded to the Assignments section of Trunk. Late assignments will not be accepted without advance permission of Dr. Rodday. Although you may work with others on homework assignments, your handed-in assignments must represent your own work.

**Quizzes:** Quizzes will be open-book format.

**Final Project:** The final project will be an individual data analysis project using a dataset provided by the instructors. You may use any course materials or other resources, but may not work with or consult with other students. The project will be assigned on Monday, 4/2/18 and due on Monday, 5/7/18 at 11:59 pm.
Course Schedule:

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topic</th>
<th>Assignments</th>
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<tbody>
<tr>
<td>Week 1</td>
<td>Thur, 1/18</td>
<td>Review of Biostatistics I (Jaharis 118)</td>
<td>Chen 2015 article</td>
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<td>Thur, 1/25</td>
<td>Computer Lab [location tbd]</td>
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<tr>
<td>Week 2</td>
<td>Mon, 1/22</td>
<td>Multiple Linear Regression I</td>
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<td>Thur, 1/25</td>
<td>Computer Lab [location tbd]</td>
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<td>Week 3</td>
<td>Mon, 1/29</td>
<td>Multiple Linear Regression II</td>
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<td>Thur, 2/1</td>
<td>Computer Lab</td>
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<tr>
<td>Week 4</td>
<td>Mon, 2/5</td>
<td>Sample Size and Power</td>
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<td>Thur, 2/8</td>
<td>Computer Lab</td>
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<tr>
<td>Week 5</td>
<td>Mon, 2/12</td>
<td>Discussion of Multiple Linear Regression Article</td>
<td>Zhang 2015 article</td>
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<td>Thur, 2/15</td>
<td>Computer Lab</td>
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<tr>
<td>Week 6</td>
<td>Mon, 2/19</td>
<td>PRESIDENTS’ DAY—No lecture</td>
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<td>Thur, 2/22</td>
<td>QUIZ 1 (Monday’s schedule, Jaharis 118)</td>
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<td>Week 7</td>
<td>Mon, 2/26</td>
<td>Logistic Regression I</td>
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<td>Thur, 3/1</td>
<td>Computer Lab</td>
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<td>Week 8</td>
<td>Mon, 3/5</td>
<td>Logistic Regression II</td>
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<td>Thur, 3/8</td>
<td>Computer Lab</td>
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<td>Week 9</td>
<td>Mon, 3/12</td>
<td>Survival Analysis I</td>
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<td>Thur, 3/15</td>
<td>Computer Lab</td>
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<td>Week 10</td>
<td>Mon, 3/19</td>
<td>SPRING BREAK—No lecture</td>
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<td>Thur, 3/22</td>
<td>SPRING BREAK—No lab</td>
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<td>Week 11</td>
<td>Mon, 3/26</td>
<td>Survival II</td>
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<td>Thur, 3/29</td>
<td>Computer Lab</td>
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<tr>
<td>Week 12</td>
<td>Mon, 4/2</td>
<td>Survival III</td>
<td>FINAL PROJECT ASSIGNED</td>
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<td>Thur, 4/5</td>
<td>Computer Lab</td>
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<td>Week 13</td>
<td>Mon, 4/9</td>
<td>Longitudinal Analysis I</td>
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<td>Thur, 4/12</td>
<td>Computer Lab</td>
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<td>Week 14</td>
<td>Mon, 4/16</td>
<td>PATRIOTS’ DAY—No lecture</td>
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<td>Thur, 4/19</td>
<td>QUIZ 2 [classroom tbd]</td>
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<td>Week 15</td>
<td>Mon, 4/23</td>
<td>Longitudinal Analysis II</td>
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<td>Thur, 4/26</td>
<td>Longitudinal Analysis III [classroom tbd]</td>
<td>Homework 5 due</td>
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<tr>
<td>Week 16</td>
<td>Mon 4/30</td>
<td>Longitudinal IV</td>
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<td>Thur, 5/3</td>
<td>READING PERIOD—No lab</td>
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<td>Week 17</td>
<td>Mon, 5/7</td>
<td>Computer Lab [classroom tbd]</td>
<td>FINAL PROJECT DUE</td>
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<td>Thur, 5/10</td>
<td>Computer Lab</td>
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* This schedule is subject to modification at the instructor’s discretion.
Course Topics, Learning Objectives and Assignments*

Week 1: Review
Learning objectives: Review methods from Biostatistics 1, including linear regression
Reading: Vittinghoff Chapter 4.1 – 4.3, 4.7

Week 2: Multiple Linear Regression I
Learning objectives: Explain methods for controlling for confounding and interaction in a statistical model
Reading: Vittinghoff Chapter 4.4-4.6
Assignments: Homework 1 assigned

Week 3: Multiple Linear Regression II
Learning objectives: Describe and contrast different multivariate model building techniques
Reading: Vittinghoff Chapter 10
Assignments: Homework 1 due

Week 4: Sample Size and Power
Learning objectives: Conduct sample size and power calculations
Reading: Vittinghoff Chapters 4.8 (required), 5.7 (optional)
Assignments: Homework 2 assigned

Week 5: Multiple Linear Regression III
Learning objectives: Discuss example of multiple linear regression article
Reading: Chen article (2015)
Assignments: Homework 2 due

Week 6: Quiz 1 on 2/22 (No class on 2/19 for Presidents’ Day)

Week 7: Logistic Regression I
Learning objectives: Fit univariate and multivariate logistic regression models
Reading: Vittinghoff Chapters 5.1 – 5.2
Assignments: Homework 3 assigned

Week 8: Logistic Regression II
Learning objectives: Discuss settings where case-control studies may be appropriate and assess logistic regression model fit
Reading: Vittinghoff Chapters 5.3 – 5.4
Assignments: Homework 3 due

Week 9: Survival Analysis I
Learning objectives: Summarize time-to-event data, including right censoring and Kaplan-Meier plots
Reading: Vittinghoff Chapters 3.5.1 – 3.5.3
Assignments: Homework 4 assigned

Week 10: SPRING BREAK

Week 11: Survival Analysis II
Learning objectives: Conduct log-rank tests, fit Cox proportional hazards models
Reading: Vittinghoff Chapters 3.5.4, 3.5.6, 6.1-6.2
Assignments: Homework 4 due

Week 12: Survival Analysis III
Learning objectives: Assess Cox model fit, propose models with time-dependent covariates
Reading: Vittinghoff Chapters 6.3, 6.4
Assignments: Homework 3 due

Week 13: Longitudinal Analysis I
Learning objectives: Introduce analysis strategies for longitudinal data
Reading: Vittinghoff Chapters 7.1-7.3
Assignments: Homework 5 assigned

Week 14: Quiz 2 on 4/19 (No class on 4/16)

Week 15: Longitudinal Analysis II
Learning objectives: Discuss strengths and limitations of the analysis of response profiles
Reading: Vittinghoff Chapters 7.4
Assignments: Homework 5 due

Week 16: Longitudinal Analysis III-IV
Learning objectives: Fit random effects models. Interpretation of results of random effects models; assessment of model fit
Reading: Vittinghoff Chapters 7.5-7.12

Week 17: Computing for Longitudinal analysis
Learning objectives: Using R, Fit random effects models, interpret results, and assess model fit.
Assignments: Final project due

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Important University Policies
Accommodation of Disabilities:
Tufts University is committed to providing equal access and support to all students through the provision of reasonable accommodations so that each student may access their curricula and achieve their personal and academic potential. If you have a disability that requires reasonable accommodations please contact the Friedman School Assistant Dean of Student Affairs at 617-636-6719 to make arrangements for determination of appropriate accommodations. Please be aware that accommodations cannot be enacted retroactively, making timeliness a critical aspect for their provision.

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
(http://students.tufts.edu/student-affairs/student-life-policies/academic-integrity-policy). 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.