COURSE DESCRIPTION
This PhD-level course introduces statistical frameworks, analytical tools, and social behavioral applications of OLS regression models, weighted least-square regression, logistic regression models, and generalized linear models.

COURSE OBJECTIVES
Upon completion of the course, students are expected to be able to:
• Understand the type and nature of research questions and data that are suitable for regression analysis;
• Use Stata computing software package to manage and analyze data with the OLS regression model;
• Understand the Gauss-Markov theorem and the BLUE property of OLS, especially conditions under which BLUE does not hold;
• Have a solid understanding of the five assumptions embedded in the OLS regression;
• Know how to conduct statistical tests detecting violations of OLS assumptions (i.e., multicollinearity, heteroskedasticity, influential data and outliers, etc.);
• Know how to take remedial measures if harmful violations exist (i.e., weighted least squares regression, etc.);
• Understand the type and nature of research questions and data that are suitable for the generalized linear models;
• Have a solid understanding of basic concepts of categorical data (i.e., odds ratio, relative risk, marginal probability, and conditional probability);
• Use Stata computing software package to manage and analyze data with the binary, ordered, and multinomial logistic regressions;
• Know how to interpret results of regression analysis and logistic regression analysis, and communicate findings to general audiences clearly and effectively in writing;
• Understand limitations of the regression and logistic regression models, and common pitfalls in using these models.

PREREQUISITES

Students are assumed to be familiar with descriptive and inferential statistics. They should have statistical and statistical software background at least equivalent to that provided by SOWO 911. Students without such prerequisites should contact the instructor to determine their eligibility to take the course.

STATISTICAL SOFTWARE PACKAGE:

This course uses Stata as the main software package

REQUIRED TEXTS


The full eBook is available via the UNC-Chapel Hill Libraries

REQUIRED ARTICLES

All required journal articles are available on Sakai. Book chapters outside the required textbook will be distributed in class.

RECOMMENDED TEXTBOOKS

Kohler, U., & Kreuter, F. (2012). *Data analysis using Stata* (3rd Ed.). College Station, TX: Stata Press
RECOMMENDED RESOURCES

Stata YouTube Channel: [https://www.youtube.com/user/statacorp](https://www.youtube.com/user/statacorp)

CLASS POLICIES

**Attendance.** Class attendance is an important element of class evaluation, and you are expected to attend all scheduled sessions. Each class session will cover a great deal of material, and students who miss even one class session are likely to fall behind. If you must miss a class session, it is your responsibility to inform the instructor via e-mail in advance of that session. You are expected not to miss more than two sessions for the whole semester. Starting from the second absence, your course grade will be reduced by 10% for each session missed.

**Incomplete & Late Assignments.** Assignments are to be turned in to the professor by 9:00 a.m. on the due date noted in the course outline. Extensions may be granted by the professor given advance notice of at least 24 hours. Grades for late assignments (i.e., those not turned in by 9:00 a.m. on the due date) will be reduced 10% for each day late (including weekend days). A grade of *Incomplete* will only be given under extenuating circumstances and in accordance with the School of Social Work and University policy.

**Bad Weather Policy.** In the case of snow, ice, or other threatening or unsafe conditions, students should follow UNC’s Adverse Weather announcements at [www.unc.edu](http://www.unc.edu) or [Adverse Weather and Emergency Phone Line](919) 843-1234. If you have any questions or concerns, please contact UNC Public Safety at 919-962-3951 (M-F, 7:30-5:00) or after business hours at 919-962-8100.

FORMAT FOR WRITTEN WORK


GRADING SYSTEM
The course uses the standard grading cutoffs adopted by the UNC Graduate School.

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<tr>
<th>Grade</th>
<th>Points</th>
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<tr>
<td>H</td>
<td>Clear Excellence</td>
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<tr>
<td>P</td>
<td>Entirely Satisfactory</td>
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<td>L</td>
<td>Low Passing</td>
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<td>F</td>
<td>Failed</td>
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The final grade is based on a possible 100-point score; Point distribution is shown below.

a) **Weekly Problem Solving (60%).** Each student must analyze datasets and create a thoughtful machine printed response (limit to 2 pages) to each homework assignment every week. Homework assignments are due in class for discussion each week, but the final copy of each homework assignment is due for grading the following week. For example, your response to the problem assigned on January 13 is due for grading on January 27. There will be 10 homework assignments, which will contribute 60% of the final course grade. Five criteria will be used to grade these homework assignments: relevance to the problem addressed, relevance of analyses conducted, clarity, parsimony and accuracy of interpretation.

b) **Weekly Evaluation (10%).** One student each week is designated to discuss the process and results of the homework assignment. Class presentation will count as 10% of the final course grade. Criteria used to assess class presentation are as follows: clarity in presentation, lack of digression from topic, avoidance of redundancy, and extra-involvement. Extra-involvement includes things such as bringing in articles relevant to the topic, constructing graphics that convey progress in learning or that illustrate difficult ideas, bringing to our attention exemplary readings you have discovered in the course of your work, etc.

c) **Class Participation (5%).** Student participation in class discussions will count as 5% of the final course grade. Criteria used to assess class participation are as follows: quality of classroom discussions, lack of digression from topic, and extra-involvement. Extra-involvement includes things such as bringing in articles relevant to topic, bringing to our attention exemplary readings you have discovered in the course of your work, etc.

d) **Final Exam (25%).** Students will use data sets provided by the instructor or their own data sets to write a research paper (no more than 10 pages, double-spaced) based on regression models discussed in the course. The paper should include: (1) research questions and data that are suitable to a regression analysis; (2) methods and specification of the regression model; (3) diagnostics detecting at least two problems pertaining to violation of regression assumptions and discussion of remedial measures; (4) interpretation of findings; and (5) presentation of findings that answers research questions effectively and efficiently.

**POLICY ON ACADEMIC DISHONESTY**

Academic dishonesty is contrary to the ethics of the social work profession, is unfair to other students, and will not be tolerated in any form. Submitted work is expected to be the student’s original work and must conform to the Honor Code of the University of North Carolina. Please refer to the APA Style Guide or the School’s Writing Resources webpage available at http://ssw.unc.edu/students/writing for information on attribution of quotes, plagiarism, and appropriate use of assistance in preparing assignments. In particular, see the video presentations “Avoiding Plagiarism Part 1” and “Avoiding Plagiarism Part 2” for information about recognizing and avoiding plagiarism.

**CODE OF HONOR AFFIRMATION**

All written products in the course must have a signed Honor Code statement. Independent
work is expected. Papers without this affirmation will not be accepted. The statement should read as follows:

*I have neither given nor received any unauthorized assistance on this assignment.*

(Your Signature)

In addition to a pledge of no plagiarism, inclusion of this affirmation statement is interpreted by the instructor as a pledge that the work is the original work of the student. In keeping with the UNC Honor Code, if reason exists to believe that academic dishonesty has occurred, a referral will be made to the Office of the Student Attorney General for investigation and further action as required.

**POLICY ON ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES**

Students with disabilities that affect their participation in the course and who wish to have special accommodations should contact the University’s Disabilities Services (Voice: 919-9628300, TTY: 711 [NC Relay] or disabilityservices@unc.edu). Disabilities Services will notify the instructor that the student has a documented disability and may require accommodations. Students should discuss the specific accommodations (e.g., changes in instructional format, examination format) with their instructor.

### CLASS SCHEDULE AND READING ASSIGNMENTS

#### Class 1

**January 13**  
Topic: Introduction and Review

**Recommended Reading:**


#### Class 2

**January 20**  
Topic: Simple Linear Regression

**Required Reading:**


**Recommended Reading:**

− Kohler, U., & Kreuter, F. (2012). Data analysis using Stata (3rd Ed.). College Station, TX.: Stata Press. *pp. 253-289*

**Assignment Due:**

− Homework 1 due in class for discussion
Class 3  
January 27  
**Topic: Assumptions of Regression**

**Required Reading:**

**Recommended Reading:**

**Assignments Due:**
- Homework 2 due for in class discussion
- Final homework 1 due for grading

Class 4  
February 3  
**Topic: Transformation and Curvilinearity**

**Required Readings:**

**Recommended Reading:**

**Assignments Due:**
- Homework 3 due for in class discussion
- Final homework 2 due for grading

Class 5  
February 10  
**Topic: Regression with Categorical Independent Variables**

**Required Reading:**

**Recommended Reading:**
- TBD

**Assignments Due:**
- Homework 4 due for in class discussion
- Final homework 3 due for grading
Class 6  
February 17  
**Topic: Multiple Linear Regression**

**Required Reading:**

**Recommended Reading:**

**Assignments Due:**
- Homework 5 due for in class discussion
- Final homework 4 due for grading

Class 7  
February 24  
**Topic: Semipartial Correlation and Suppression**

**Required Reading:**

**Recommended Reading:**

**Assignments Due:**
- Homework 6 due for in class discussion
- Final homework 5 due for grading

Class 8  
March 2  
**Topic: Testing Assumptions of Multiple Regression**

**Required Reading:**

**Recommended Reading:**

**Assignments Due:**
- Homework 7 due for in class discussion
- Final homework 6 due for grading
<table>
<thead>
<tr>
<th>Class 9</th>
<th>Topic: Outliers, Influential Data Points, and Missing Data</th>
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<tbody>
<tr>
<td>March 9</td>
<td>Required Reading:</td>
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<td>- Homework 8 due for in class discussion</td>
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<td>- Final homework 7 due for grading</td>
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<td>March 16</td>
<td>Spring Break – No class</td>
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<thead>
<tr>
<th>Class 10</th>
<th>Topic: Interactions Between Independent Variables</th>
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<tr>
<td>March 23</td>
<td>Required Reading:</td>
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<td>Recommended Reading:</td>
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<td>Assignments Due:</td>
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<td>- Homework 9 due for in class discussion</td>
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<td>- Final homework 8 due for grading</td>
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<thead>
<tr>
<th>Class 11</th>
<th>Topic: Logistic Regression I</th>
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<tr>
<td>March 30</td>
<td>Required Reading:</td>
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<td>Recommended Reading:</td>
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Assignments Due:
- Homework 10 due for in class discussion
- Final homework 9 due for grading

Class 12
April 6

Topic: Logistic Regression II

Required Reading:

Recommended Reading:

Assignment Due:
- Final homework 10 due for grading

Class 13
April 13

Topic: Multinomial Logit and Probit Regression

Required Reading:

Recommended Reading:

Class 14
April 20

Topic: Poisson Regression

Required Reading:

Recommended Reading:

Assignment Due:
- Final paper due