This course provides an introduction to the theory, methods, and practice of regression analysis. The goals are to provide students with the skills that are necessary to: (1) read, understand, and evaluate the professional literature that uses regression analysis; (2) design and carry out studies that employ regression techniques for testing substantive theories; and (3) prepare to learn about more advanced statistical procedures.

Any course of this type must assume a working knowledge of elementary statistical concepts and techniques. We will conduct a brief review at the beginning of the course, but students must be familiar with such ideas as descriptive statistics, sampling distributions, statistical inference, and hypothesis testing, before moving on to the more complicated matters that will comprise the majority of the course material. The course will not dwell on statistical theory. But, we will focus on the nature of the basic regression model, and the development of the regression estimators. We will see that this model depends very heavily on several assumptions. Therefore, we will examine these assumptions in detail, considering why they are necessary, whether they are valid in practical research situations, and the consequences of violating them in particular applications of the regression techniques. These formal, analytic treatments will be counterbalanced by the use of frequent substantive examples and class exercises. Again, the overall course objective is not to turn you into a statistician--instead, we are trying to maximize your research skills as a social scientist.

Formal course requirements are as follows: (1) Class attendance and active participation. This is mandatory. Statistical knowledge is cumulative, and gaps in the early material will always have detrimental consequences later on. (2) Completion of class assignments. Most of these are computer exercises, designed to familiarize you with the application of various concepts and techniques introduced in class. Each of these assignments will focus on a specific set of topics. However, the latter assignments are cumulative in the sense that they build upon earlier material in the class.
The following are the recommended texts for the course:


The following books are useful reference books:


Thomas H. Wonnacott and Ronald J. Wonnacott. *Introductory Statistics*.


The following books are supplemental:

William D. Berry. *Understanding Regression Assumptions*.

William D. Berry and Stanley Feldman. *Multiple Regression in Practice*.


John Fox. *Regression Diagnostics*.

McKee J. McClendon. *Multiple Regression and Causal Analysis*.


Students should pay special attention to the readings in the recommended texts. This material is critical for the course. It would be wise to read all the material assigned in the recommended texts. So, you should obtain copies of Lewis-Beck, Schroeder et al, and Gujarati & Porter. You should also have access to a basic reference book, such as Bohrnstedt/Knoke/Mee, Hamilton, Weiss, or Wonnacott/Wonnacott. Although these reference books are not required texts, they will prove useful for reviewing basic concepts and introductory material. And they will also provide reasonable alternative discussions of the bivariate and multiple regression models. Most of the supplemental books are either too specialized or advanced to be used as central texts in a course of this type. However, several of them are very good and would be extremely useful books to add to your own library. I encourage you to look at these supplemental texts; however, they are not required texts for the course. Use the readings listed on the following pages to follow along with the material, particularly the readings in the recommended texts.
Topics and Reading Assignments

I. Introduction to Regression Analysis

*Required Reading:
  Gujarati and Porter (Essentials of Econometrics), pp. 1-18

Additional Reading:
  McClendon, pp. 1-19
  Gujarati and Porter (Basic Econometrics), pp. 15-32
  Montgomery, Peck and Vining, pp. 1-11

II. Preliminary Material and Statistical Review

A. Frequency Distributions, Univariate Statistics, Probability Distributions

*Required Reading:
  Gujarati and Porter (Essentials of Econometrics), Appendices A & B, pp. 403-460

Additional Reading:
  McClendon, pp. 20-25
  Gujarati and Porter (Basic Econometrics), pp. 801-823
  Hamilton, pp. 3-110
  Bohrnstedt, Knoke, and Mee, pp. 27-92, 135-154
  Wonnacott and Wonnacott, pp. 25-60, 109-116, 124-141
  Weiss, pp. 2-231

B. Statistical Inference and the Properties of Statistical Estimators

1. Confidence Intervals & Hypothesis Tests

*Required Reading:
  Gujarati and Porter (Essentials of Econometrics), Appendix C, pp. 461-486

Additional Reading:
  Gujarati and Porter (Basic Econometrics), pp. 823-837
  Hamilton, pp. 241-259
  Hamilton, pp. 260-354
  Bohrnstedt, Knoke, and Mee, pp. 154-179
  Wonnacott and Wonnacott, pp. 254-264, 287-297, 300-310, 314-317
  Weiss, pp. 280-485
II. Preliminary Material and Statistical Review (continued)

B. Statistical Inference and Hypothesis Tests

2. Differences Between Two Means, Two Variances, Etc.

*Required Reading:
Gujarati and Porter (Essentials of Econometrics), Appendix D, pp. 487-514

Additional Reading:
Hamilton, pp. 397-456
Bohrnstedt, Knoke, and Mee, pp. 187-212
Wonnacott and Wonnacott, pp. 265-273
Weiss, pp. 486-647

C. Linear Combinations

Additional Reading:
McClendon, pp. 25-28
Wooldridge, pp. 707-802

III. The Bivariate Regression Model

A. Introduction: Basic Ideas and Concepts

*Required Reading:
Lewis-Beck, pp. 9-26
Schroeder, Sjoquist, and Stephan, pp. 11-23
Gujarati and Porter (Essentials of Econometrics), pp. 19-33

Additional Reading:
Berry, pp. 1-22
Bohrnstedt, Knoke, and Mee, pp. 253-266
Hamilton, pp. 457-476
Gujarati and Porter (Basic Econometrics), pp. 34-54
McClendon, pp. 28-30
Montgomery, Peck, and Vining, p. 12
Wonnacott and Wonnacott, pp. 357-370
Weiss, pp. 694-741
III. The Bivariate Regression Model
   (continued)

B. The Least Squares Criterion and Estimation in the Bivariate Regression Model

*Required Reading:
   Gujarati and Porter (Essentials of Econometrics), pp. 33-38

Additional Reading:
   Berry and Feldman, pp. 31-41
   Hamilton, pp. 468-477
   Gujarati and Porter (Basic Econometrics), pp. 55-61
   Bohrnstedt, Knoke, and Mee, pp. 266-274, 284-286
   Wonnacott and Wonnacott, pp. 474-496
   Kennedy, pp. 11-59
   Wooldridge, pp. 50-66, 89-95, 106-126, 176-181, 187-190

C. Goodness of fit, the Correlation Coefficient and $R^2$

*Required Reading:
   Schroeder, Sjoquist, and Stephan, pp. 23-29
   Gujarati and Porter (Essentials of Econometrics), pp. 38-52

Additional Reading:
   McClendon, pp. 42-49
   Gujarati and Porter (Basic Econometrics), pp. 73-94
   Montgomery, Peck, and Vining, p. 35
   Hamilton, pp. 477-483

D. Statistical Inference, Confidence Intervals, and Hypothesis Tests

*Required Reading:
   Lewis-Beck, pp. 26-47
   Schroeder, Sjoquist, and Stephan, pp. 36-53
   Gujarati and Porter (Essentials of Econometrics), pp. 53-92

Additional Reading:
   Hamilton, pp. 503-525
   Gujarati and Porter (Basic Econometrics), pp. 107-147
   Bohrnsted, Knoke, and Mee, pp. 277-284
   Montgomery, Peck, and Vining, pp. 22-39
   Wonnacott and Wonnacott, pp. 372-395
   Kennedy, pp. 51-90
   Wooldridge, pp. 126-147
   Weiss, pp. 742-797
III. The Bivariate Regression Model (continued)

E. Summary, Extensions, and a Preliminary Look at Residuals, Outliers, and Influential Cases

Additional Reading:
  McClendon, pp. 49-59
  Gujarati and Porter (Basic Econometrics), pp. 147-188
  Montgomery, Peck, and Vining, pp. 42-58
  Hamilton, pp. 492-495, 535-551
  Berry, pp. 22-88

IV. The Multiple Regression Model

A. Introduction: Notation, Assumptions, and Interpretation

*Required Reading:
  Lewis-Beck, pp. 47-54
  Schroeder, Sjoquist, and Stephan, pp. 29-32
  Gujarati and Porter (Essential Econometrics), pp. 93-102

Additional Reading:
  Hamilton, pp. 563-566
  Bohrnstedt, Knoke, and Mee, pp. 381-390
  McClendon, pp. 60-80
  Gujarati and Porter (Basic Econometrics), pp. 188-195
  Montgomery, Peck, and Vining, pp. 67-84
  Wonnacott and Wonnacott, pp. 396-406
  Berry and Feldman, pp. 9-18
  Wooldridge, pp. 73-88

B. Measures of Goodness of Fit

*Required Reading:
  Schroeder, Sjoquist, and Stephan, pp. 32-36
  Gujarati and Porter (Essentials of Econometrics), pp. 102-104; 113-116

Additional Reading:
  Bohrnstedt, Knoke, and Mee, pp. 392-396
  Wonnacott and Wonnacott, pp. 496-501
  McClendon, pp. 80-83
  Gujarati and Porter (Basic Econometrics), pp. 196-206
IV. The Multiple Regression Model (continued)

C. Statistical Inference and the Role of Hypothesis Testing

*Required Reading:
  Gujarati and Porter (Essentials of Econometrics), pp. 104-107

Additional Reading:
  Hamilton, pp. 566-568
  Bohrnstedt, Knoke, and Mee, pp. 396-409
  Wonnacott and Wonnacott, pp. 406-408
  Berry and Feldman, pp. 9-18
  Kennedy, pp. 60-80
  Wooldridge, pp. 147-167, 214-218
  Gujarati and Porter (Basic Econometrics), pp. 233-243

D. Summary and a Brief Look at Extensions

*Required Reading:
  Gujarati and Porter (Essential of Econometrics), pp. pp. 116-131

Additional Reading:
  McClendon, pp. 93-116
  Montgomery, Peck, and Vining, pp. 88-111
  Gujarati and Porter (Basic Econometrics), pp. 243-277

V. Model Building in Multiple Regression Analysis

A. Models of Substantive Phenomena and the Importance of Model Assumptions

*Required Reading:
  Gujarati and Porter (Essentials of Econometrics), pp. 160-163
  Lewis-Beck, pp. 63-66

Additional Reading:
  McClendon, pp. 83-93
  Montgomery, Peck, and Vining, pp. 111-116
  Hamilton, pp. 574-576
  Wonnacott and Wonnacott, pp. 410-424
  Berry, pp. 1-24
V. Model Building in Multiple Regression Analysis
   (continued)

B. Model Specification

*Required Reading:
   Gujarati and Porter (Essentials of Econometrics), pp. 112-113; 219-244
   Lewis-Beck, pp. 30-45
   Schroeder, Sjoquist, and Stephan, pp. 67-70

Additional Reading:
   McClendon, pp. 288-321
   Gujarati and Porter (Basic Econometrics), pp. 467-522
   Montgomery, Peck, and Vining, pp. 327-366; pp. 372-386
   Berry, pp. 30-45
   Berry and Feldman, pp. 18-26
   Kennedy, pp. 71-92

C. Nominal Independent Variables

*Required Reading:
   Schroeder, Sjoquist, and Stephan, pp. 56-58
   Gujarati and Porter (Essentials of Econometrics), pp. 178-215

Additional Reading:
   McClendon, pp. 198-229
   Gujarati and Porter (Basic Econometrics), pp. 277-314
   Montgomery, Peck, and Vining, pp. 260-280
   Hamilton, pp. 576-580
   Bohrnstedt, Knoke, and Mee, pp. 409-419
   Kennedy, pp. 248-258
   Wooldridge, pp. 230-252

D. Functional Forms and Nonlinear Models

*Required Reading:
   Schroeder, Sjoquist, and Stephan, pp. 58-61
   Gujarati and Porter (Essentials of Econometrics), pp. 132-177

Additional Reading:
   McClendon, pp. 230-287
   Gujarati and Porter (Basic Econometrics), pp. 523-540
   Montgomery, Peck, and Vining, pp. 171-187
   Berry, pp. 60-66
   Hamilton, pp. 583-584
   Berry and Feldman, pp. 51-72
   Wooldridge, pp. 304-390
VI. Potential Problems in Multiple Regression Analysis

A. Multicollinearity and Its Effects

*Required Reading:
Lewis-Beck, pp. 58-63
Schroeder, Sjoquist, and Stephan, pp. 71-72
Gujarati and Porter (Essentials of Econometrics), pp. 245-273

Additional Reading:
Gujarati and Porter (Basic Econometrics), pp. 320-364
McClendon, pp. 161-163
Montgomery, Peck, and Vining, pp. 117-121; pp. 285-323
Wonnacott and Wonnacott, pp. 501-506
Hamilton, pp. 580-581
Berry, pp. 24-27
Berry and Feldman, pp. 37-50
Kennedy, pp. 192-202
Wooldridge, pp. 101-105

B. Nonnormal and Nonconstant (Heteroscedastic) Errors

*Required Reading:
Schroeder, Sjoquist, and Stephan, pp. 75-77
Gujarati and Porter (Essentials of Econometrics), pp. 274-311

Additional Reading:
McClendon, pp. 174-195
Gujarati and Porter (Basic Econometrics), pp. 365-411
Montgomery, Peck, and Vining, pp. 188-194
Berry and Feldman, pp. 73-88
Berry, pp. 67, 72-81
Fox, pp. 40-53
Kennedy, pp. 133-139
Wooldridge, pp. 181-185

C. Measurement Error

*Required Reading:
Schroeder, Sjoquist, and Stephan, pp. 70-71
Gujarati and Porter (Essentials of Econometrics), pp. 229-230

Additional Reading:
Gujarati and Porter (Basic Econometrics), pp. 524-528
Berry and Feldman, pp. 26-37
Berry, pp. 45-60
D. Residual Analysis, Outliers, and Influential Observations

*Required Reading:
   Gujarati and Porter (Essentials of Econometrics), pp. 234-235; 283-285

Additional Reading:
   Gujarati and Porter (Basic Econometrics), pp. 496-497
   Montgomery, Peck, and Vining, pp. 129-164; pp. 211-253
   Berry, pp. 27-29
   Fox, pp. 21-40
   Kennedy, pp. 372-388

VII. Additional Topics

A. Dichotomous Dependent Variables

*Required Reading:
   Schroeder, Sjoquist, and Stephan, pp. 79-80
   Gujarati and Porter (Essentials of Econometrics), pp. 201-205

Additional Reading:
   Gujarati and Porter (Basic Econometrics), pp. 541-591
   Montgomery, Peck, and Vining, pp. 389-416; pp. 421-462
   Wooldridge, pp. 252-258 Gujarati and Porter (Basic Econometrics), pp.

B. Simultaneous Equation Models

*Required Reading:
   Schroeder, Sjoquist, and Stephan, pp. 77-79
   Gujarati and Porter (Essential Econometrics), pp. 347-370

Additional Reading:
   Gujarati and Porter (Basic Econometrics), pp. 671-688
   McClendon, pp. 288-347
   Berry, pp. 1-54

C. A Brief Introduction to Panel Data Models, Time Series Models and Other Models of Interest

*Required Reading:
   Schroeder, Sjoquist, and Stephan, pp. 72-75
   Gujarati and Porter (Essential Econometrics), pp. 371-401

Additional Reading:
   Gujarati and Porter (Basic Econometrics), pp. 737-772
   Berry, pp. 67-72
   Kennedy, pp. 139-156; 163-179