Erik Biørn/Ragnar Nymoen, *revised March13, 2012*

ECON 3150/4150 - INTRODUCTORY ECONOMETRICS

LECTURE PLAN -- SPRING 2012

Lectures:

Time and place: Friday 10:15-12:00, Auditorium 1 (Weeks 3 - 17: 13 lectures)
Monday 16:15-18:00, Auditorium 7 (Weeks 3 - 9: 6 lectures)
Duration: 19 two-hour lectures.
First lecture: January 16. Last lecture: April 27.
No lecture: February 20 and 24 (week 8, lecture free week) and April 6 (week 14, Easter).
Lecturers: Erik Biørn (EB, 13 lectures) and Ragnar Nymoen (RN, 6 lectures)

Seminars and Stata exercises:

Schedule, seminar leaders and other details on web site

Syllabus:

C. Hill, W.E. Griffiths, G.C. Lim: Principles of Econometrics, 4th ed., Wiley 2012, Chap. 1–10.

Schedule (may be subject to change):

Week	Lecture & Lecturer (EB, RN)
3	1-EB, 2-RN
4	3-RN,4-RN
5	5-RN,6-RN
6	7-RN,8-EB
7	9-EB,10-EB
8	-
9	11-EB,12-EB
10	13-EB
11	14-EB
12	15-EB
13	16-EB
14	-
15	17-EB
16	18-EB
17	19-EB

Lectured topics

EB lectures on Topics 1 & 5-12. RN lectures on Topics 2-4.

References to relevant chapters in the textbook are given in the title of the topics and in parentheses under the sub-topics (may be subject to change). The lectures will not cover all parts of the syllabus. Supplementary lecture notes will be posted on the web.

1. Introduction (Chapters 1 and 2).

What is Econometrics? (1)
Why models? On econometric modelling (2.1-2.2)
Data types in econometrics: Cross-section, Time series, Panel .
Data variation. Correlation. Correlation and causality.
Regression analysis without model.

2. The regression model with one fixed regressor (Chapter 2).

The regression function and the disturbance. 2.1 and 2.2 .
Looking ahead: What does 'fixed regressors' mean, and why do we make this assumption?
Ordinary Least Squares (OLS) estimators and their properties .
Gauss-Markov's Theorem (2.3-2.7).
Residuals and their relation to disturbances (errors).
Looking ahead: Variable transformations and the choice of functional form problem (2.8)
Qualitative explanatory variable (2-9)

> The lectures on topic 2 and 3 will assume of knowledge statistics at the level of the *Probability Primer* in Chapter 1. It is therefore a good idea to read the *Probability Primer* before Lecture 2. Later lectures will make more specific references to Appendices B and C

3. Inference in the regression model with one fixed regressor (Chapter 3).

Statistical background: The Normal, Chi-square and t-distribution.
One and two sided tests about the regression coefficient. (3.2-3.4.)
Confidence intervals for regression coefficients (3.1).
The P-value (3.5).
Examples related to Phillips curves and Engel functions .

4. The regression model with one stochastic regressor (Chapter 10 and Appendix B)

Statistical background: (Appendix B).

Expectation and variance to functions of stochastic variables.

Conditional distributions and conditional expectations.

The rule of iiterated expectation.

Linearity of conditional expectations , E(y|x).

The linear conditional expectation function: The linear regression function.

Binormal distribution as a `case study' – linear regression functions in both directions and marginal distributions normal.

Linear regression function as a modeling assumption: E(y|x), linear, but marginal distribution of x non-normal

Specification of the regression model (10.1).

Properties of OLS estimators (10.1.1 , 10.1.2).

Inference.

Correlation and causality.

Looking ahead: Expectations and the Lucas critique.

5. Prediction and modelling issues (Chapter 4).

Estimating expected regressand [E(Y)].

Applying the simple regression model for prediction (4.1).

Prediction errors and prediction intervals.

Measuring goodness-of-fit.

6. Elements of statistical background for multiple regression (Appendix B and C).

Asymptotic theory : Probability limits and "Slutsky's theorem" .

Consistency of OLS estimators in the regression model with stochastic regressors.

Survey of three important distributions related to N(0,1).

The Maximum Likelihood (ML) principle - generalities. Examples related to regression analysis.

Background to inference for joint hypotheses: The F-distribution (6A).

7. Multiple Least Squares Regression analysis (Chapters 5 and 6).

The least squares method with two regressors (5.1-5.6) .

R- Square and standard error of regression.

Hypothesis testing in multiple regression, the F-test (6.1-6.5) .

Relationshp between F-test statistics and R-Square.

The gross and partial effects of an explanatory variable (6.6).

The omitted variables problem (6.6).

Collinearity between the explanatory variables (6.7).

8. Random regressors and moment-based estimation (Chapter 10).

Some algebra for variances and covariances.
The simple method of moments (10.1, 10.2).
Instrumental variables – some basics and examples (10.3).

9. Functional form and dummy-variables (Chapter 7).

Log-linear models (4.4, 7.5) .
Polynomial regression.
Dummy-variables as a way of representing qualitative explanatory variables (7.2-7.4)
Interactions, including interactions between qualititative variables.
Dummy variables and individual effects in a panel data regression model.

10. Extension of classical regression model: Disturbance heteroskedasticity (Chapter 8).

Consequences for the least squares estimator (8.2) .
The generalised least squares estimator – weighted regression (8.3) .
Detection and handling of heteroskedasticity. How exploit residuals ? Formal tests (8.4).

11. Extension of classical regression model: Disturbance auto-correlation (Chapter 9).

Consequences for the least squares estimator (9.1-9.3) .
Auto-regressive processes –brief introduction (9.5-9.7).
Detection of and testing for auto-correlation . How exploit residuals ? Durbin-Watson test (9.4).

12. Synthesis and conclusion

Overview of lectured topics.
Remarks on non-experimental data, simultaneity, exogeneity, etc.