

DGPEFunded by The Danish Research
Training Council (FUR)**Danish Graduate Programme in Economics**

University of Aarhus • University of Copenhagen

**CREATES**

Center for Research in Econometric Analysis of Time Series

The Danish Graduate Programme in Economics (DGPE) and Center for Research in Econometric Analysis of Time Series (CREATES) announce:

Ph.D. course on “Advanced Programming in Quantitative Economics”

August 15-19, 2011

Lectures (L): room 036, Building 1325

Practice (P): computer rooms 4+5, 3rd floor, Building 1325

Lectured by: Professor Charles Bos, VU University Amsterdam, and Henning Bunzel, School of Economics and Management, Aarhus University
Local Organizer: Henning Bunzel, Aarhus University

Programme

Monday, August 15, 2011

09.30–11.00 L	Introduction <ul style="list-style-type: none">- Programming by example- Concepts of data, variables, functions
11.00-12.30 P	Implementation of first programme
12.30–13.30	Lunch in the canteen
13.30–14.30 L	Structuring your thoughts <ul style="list-style-type: none">- What is programming?- Preparation of program
14.30–16.00 P	Tutorial <ul style="list-style-type: none">Exercise, extending earlier workWork through ‘Introduction to Ox’, Ch 1-5

Tuesday, August 16, 2011

09.00–10.30 L	Structuring your programme <ul style="list-style-type: none">- Recursive programming- Building blocks- Declarations/data/actions/output- Passing data back and forth
10.30-12.00 P	Reimplementation of first programme <ul style="list-style-type: none">- dissect it into minimal blocks

- 12.00–13.00 - test passing variables back-and-forth
Lunch in the canteen
- 13.00–14.30 **L** Background of computations (Henning Bunzel)
 - Floating point numbers and rounding errors
 - Compilers and CPUs
 - Computing environment at Aarhus University
- 14.30–16.00 **P** Simulate data duration model
 - Apply concepts of the day
 - Think of rounding errors

Wednesday, August 17, 2011

- 09.00–10.30 **L** Optimization I
 - Newton-Raphson and quadratic approximation
 - Hessian: Importance and problems
 - Loglikelihood and Covariance
 - MaxBFGS
- 10.30-12.00 **P** Estimating a duration model I
 - dissect it into minimal blocks
 - test passing variables back-and-forth
- 12.00–13.00 Lunch in the canteen
- 13.00–14.30 **L** Optimization II
 - Restrictions, transformations
 - Delta-method for covariance estimation
- 14.30–16.00 **P** Implementing covariance estimation
 - Duration model with restriction
 - Covariance of parameter estimates
- 18.00 Course dinner at ‘Sct. Oluf’

Thursday, August 18, 2011

- 09.00–10.30 **L** Object oriented programming
 - Concepts of objects
 - Implementation issues for Modelbase
- 10.30-12.00 **P** Estimating a duration model II
 - Setting up a class
 - Moving likelihood to modelbase
- 12.00–13.00 Lunch in the canteen
- 14.15 Seminar
- 16.00-17.00 **L** Added capabilities
 - Graphics packages
 - ARFIMA/SsfPack and others

Friday, August 19, 2011

- 09.00–10.30 **L** Data handling
 - Difference in formats
 - Reading large datasets

10.30-12.00	P	- Selecting and transforming: HF Duration modelling
		- Read transaction data sets
		- Implementing autoregressive duration model or: Using packages
		- Graphing
		- AR(p) estimation with/without ARFIMA package
12.00–13.00		Lunch in the canteen
13.00–14.30	L	Efficiency and remaining topics
		- Alternative algorithms
		- Matrices
		- Own code/existing functions/C-code
		- Others
14.30–15.30	P	Finding the difference
		- AR(p) estimation: loop vs arma() vs ARFIMA package
		- Moving likelihood to modelbase
15.30-		Handing out exam
		Final remarks

Remarks on Exam

This course gives 5 ECTS.

Examination

Take home exam, to be handed in by email before Friday, October 21, 2011, 09.00h to cbos@feweb.vu.nl. Exam consists in solving an Econometric exercise, given a rough data file and the model to be implemented. Students will hand in, in groups of max. 3 students:

- Report with analysis of problem, data description, graphic results, parameter estimation. Max. 5 pages excluding graphs/tables.
- Programs 'ready-to-run', including cleaned (if necessary) data files.

Exam will be marked on the basis of

- Structure of solution (relating to analysis of problem) [20%]
- Readability of programs/comments [20%]
- Correctness of programming [20%]
- Robustness of programming [20%]
- Choice of descriptive statistics/graphs [10%]
- Report, relating to structure of solution [10%]

Between brackets the approximative weight of each part in the final mark.