**BONN UNIVERSITY**  
Department of Economics

**Summer 2011**

**Course:** Dynamic Macroeconomics  
**Time and Location:** Fridays 9.00 - 12.15 p.m., Seminarroom Kaiserplatz 7-9  
(startering April 8)  
**Instructors:** Prof. Dr. Christian Bayer [christian.bayer@uni-bonn.de](mailto:christian.bayer@uni-bonn.de) and  
JProf Dr. Alexander Kriwoluzky, [a.kriwoluzky@uni-bonn.de](mailto:a.kriwoluzky@uni-bonn.de)

**COURSE CONTENT**

This course is aimed at graduate students and advanced master level students with a special research interest in macroeconomics. It introduces into the current methods used to study dynamic stochastic general equilibrium models. The course is taught in two parts. Part A (Kriwoluzky) develops the tools to set up, solve locally and estimate in a Bayesian fashion medium scale General equilibrium models with representative agents. Part B (Bayer) develops the tools to set up, solve globally and estimate by methods of moments models of heterogeneous agents and incomplete markets.

**ASSIGNMENTS:**

Each class session consist of a lecture and an exercise part. Students are required to prepare and present solutions to numerical / programming problems each week.

**READING**

**Part A:**  

**Part B:**  

**GRADING**

The course grade will be based on the solution of exercises (20%) and an oral exam (80%).
COURSE CONTENTS

PART A:

BAYESIAN DSGE MODEL ESTIMATION

(Starts April 8, 2011)

I Introduction

II Solving a DSGE model:  week 1-2

1) Introduction of the Benchmark-DSGE model
2) Derivation of the log-linearized model
3) Implementation and solution of the DSGE model in Matlab

II Kalman Filter and VAR representation:  week 3

1) State space form of the DSGE model
2) VAR representation of the DSGE model
3) Kalman Filter: Derivation and iteration steps

III Likelihood estimation of a DSGE model  week 4

1) The likelihood of a DSGE model
2) Maximizing the likelihood and approximating the Hessian

IV Bayesian Estimation  week 5

1) Introduction into Bayesian estimation
2) Specification of prior distributions

V Sampling Algorithm  week 6

1) Monte Carlo Markov Chain: Metropolis sampling

VI Further Topics in Bayesian model estimation  week 6-7

1) Diagnostics of the sampling algorithm
2) Model comparison
3) In case there is time: Identification of structural parameters
PART B: HETEROGENEOUS AGENTS AND INCOMPLETE MARKETS & GLOBAL SOLUTION METHODS
(Starts May 27, 2011)

I Introduction

II The Basics: week 1-3
   1) Value Function Iteration
   2) Markov Chains and AR Processes
   3) Interpolation
   4) Off-grid vs. On-grid choice
   5) Improvements over Value Function Iteration (Multigrids, PFI)
   6) Projection Methods

III Estimation week 4
   1) A reminder: ML Estimation, GMM Estimation
   2) Simulation based techniques – a generalized approach

IV (General) Equilibrium (Introduction) week 5
   1) Zero Profit Conditions
   2) Strategic Interactions
   3) Recursive General Equilibrium

V Stationary heterogeneous agent economies week 5-6
   1) Huggett model
   2) Aiyagari model

VI Heterogeneous Agent Economies with aggregate fluctuations week 7
   1) Krusell and Smith’s Algorithm
   2) Other solution methods