# Dynamic Macroeconomics (Part I)
# University of Bonn

JProf. Dr. Donghai Zhang

Summer Semester 2022

*Outline*:
This course introduces students to techniques that allow them to solve and bring modern business cycle models to the data. Importantly, this course is designed as a hands-on course that requires students to write their own Matlab code to implement the concepts discussed in class! This is the first half of a full semester course. The second half will be taught by Prof. Christian Bayer. Tutorials/exercise sessions are integrated into the lectures.

*Matlab*: You will need to bring your own laptop to all lectures. Matlab licenses will be made available in class. A Matlab primer is available in a shared dropbox folder. Please also download the Sims-folder from the shared dropbox folder and store it in a directory you will be working in during the course. Please install Dynare.

*Lectures*:
The first half consists of 10 lectures with 2 hours per lecture.
Thursday and Friday 10:00-12:00;
Room: Horsaal F
First lecture: April 7, 2022.

*Office Hours*:
After lectures or upon appointment (email: donghai.zhang@uni-bonn.de).
*Course Homepage*:
All relevant materials for the course are available in a shared dropbox folder
*Grades*:
Grades will be based on a final **oral** exam.

*Part II of the Course*:
Part II will be taught by Prof. Christian Bayer

## List of Topics

1. **Linear Rational Expectations Models**
    - Lecture 1 (Optional): The Real Business Cycle model
    - Lecture 2: The New Keynesian model
    - Lecture 3: Three Ways of Solving Linear Rational Expectations Models
    - Lecture 4: Dynare
    - Lecture 5: NK v.s RBC: evidence from SVAR
2. **Solution of Non-linear Deterministic Models**.
    - Lecture 6: Root-finding algorithms
    - Lecture 7: NK with the ZLB constraint
        - Method 1: Occasional binding constraint
        - Method 2: Complementarity Problem
        - A stochastic NK model with the ZLB constraint: analytical solution
3. **The Kalman Filter and Maximum Likelihood Estimation of DSGE Models**
    - Lecture 8: Kalman Filter theory
    - Lecture 9: Kalman Filter applications
4. **Bayesian Estimation**
    - Lecture 10: Bayesian theory and application
5. **An Introduction to Models with Information Frictions (Optional)**

Please note: I reserve the right to change the information in this syllabus at any time.