

# Agent-based Control in Digitalized Energy Systems

*Practical Course WiSe 25/26*

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# Research Group Digitalized Energy Systems

- Focus: Resilient operation of digitalized energy systems
- 12 scientists
  - Fundamental / teaching
  - Applied research
  - OFFIS-related
- Publications
  - <https://uol.de/des/forschung/publikationen>
  - <https://uol.de/des/forschung/poster>



Astrid Nieße



Rico Schrage

# Organization

- The practical part will be divided into two parts: the exercise sheets and the mini project.
- 1. Exercise sheets (not graded, highly recommended!)
  - There will be 5 (+1) exercise sheets.
  - The sheets are **not graded!** But you will receive individual feedback, and it is a good preparation for part 2!
  - The exercises will only cover some parts of the lecture
  - Objective: Introduce you to implementing asynchronous agents using **mango** while repeating some topics which you got to know in the lecture

# Organization

## 2. Mini project (graded, **mandatory**)

- Starting in December we will hand out topics for mini projects. **To pass the exam you also need to pass the project!**
- For an extraordinary submission you are able to receive a bonus, which can improve your grade up to 0.4.
  - So there are essentially 0 (=failed), 1 (=passed), 2 (=passed with bonus)
- The mini project will cover one specific topic of the lecture in which we want you to dive a little bit deeper
- Starting on **04<sup>th</sup> of December!**

# Organization

## Mini project preview

- Agent-based control to operate a specific aspect of an electrical network (voltage control, active power balancing, fixing thermal line overloads, ...)
- Design an agent for an energy market bidding problem
- Agent-based tie-line-switching on line-failures
  
- **Uncertain and Highly Experimental:** Applying language models to the energy domain (e.g. human interaction, reasoning on a specific problem, using language models as part of a cognitive agent architecture)

# Organization

## – For the exercise sheets:

- I recommend working on the exercise sheets individually, but you can also submit group solutions. All submission **must** be done using the StudIP Folder "Submission Exercise Sheets" (under Files).
- Please always submit a zip file containing only .py and .pdf files! Ensure your scripts are executable!
  - Name it "<Surname>\_<Forename>\_Ex\_<number>.zip" (e.g. "Schrage\_Rico\_Ex\_1")
    - Groups can choose a groupname or use one or multiple surnames

## – For the mini project:

- You can attend the practical part in **groups with 2-3 members**.
  - Registration in StudIP (Participants -> Groups)
  - Registration will be closed on **11th of December!**
- Submission is done using your Group Document folder (under Files)

# Organization

- **On the thursday meetings (until mini project starts)...**
  - We will briefly discuss the exercise sheet of the last week
  - We will look at the next exercise sheet
  - You are invited to start working on the next exercise sheets under our supervision

# General Notes on all submissions in this course

- **Use of mango is mandatory!**
  - Mostly for practical reasons (simplifies feedback, harmonizes the submissions)
- **Use AI assistants with care!**
  - Not great at dealing with the framework mango
  - You will not learn asynchronous/agent-driven programming by using them to solve exercises
- **You will only get valuable Feedback on running/executable scripts!**
  - If you can't get around some python error/misbehavior, you can describe your problem as part of the submission and still get feedback on that part

# Schedule Part One: Exercise sheets

Date	Topic
23.10	mango Introduction, Exercise sheet 1
30.10	Cancelled (no meeting, no deadline)
05.11	Deadline for exercise sheet 1
06.11	Discussion exercise sheet 1, Exercise sheet 2
11.11	Deadline for exercise sheet 2
12.11	Discussion exercise sheet 2, Exercise sheet 3
19.11	Deadline for exercise sheet 3
20.11	Discussion exercise sheet 3, Exercise sheet 4
25.11	Deadline for exercise sheet 4
26.11	Discussion exercise sheet 4, Exercise sheet 5
03.12	Deadline for exercise sheet 5
04.12	Discussion exercise sheet 5, Intro Mini Projects

# mango Introduction

# Exercise Sheet 1