

Course Syllabus: AT.504.EN Discrete Event Systems

Instructor: Yuri Shardt (e-mail: yuri.shardt@tu-ilmenau; Website: <http://www.tu-ilmenau.de/en/dept-automation>)

Office: Zusebau 3006

Office Hours: I follow the open-door policy. When I am in my office, I will happily answer your questions. If you wish a fixed appointment, please e-mail me to arrange it. I am not available Thursdays and Tuesdays afternoon.

E-Mail Policy: I will respond to all e-mails within 1 workday after arrival. A day runs from 9:00 pm to 9:00 pm the next day. Weekends are excluded from the computation. In the subject header of your e-mails, please include the phrase “[AT.504]” followed by the topic of the e-mail (e.g. [AT.504]: Question about Lecture 1), so that I can respond faster to your e-mails.

Course Website: <http://www.tu-ilmenau.de/at/lehre/at504-ereignisdiskrete-systeme>

Lecture: Tuesdays: 8:00 to 11:00 am on Skype, except June 15th and July 13th, 2021

NB: This is an online course. The online lectures will cover all the required material at a normal pace. Short breaks will be taken during the three-hour lecture period.

Course Overview

This course examines the modelling and control of discrete event systems using automata. Both theoretical and practical results are provided that allow for different cases to be solved. The main topics are:

- 1) Introduction to Discrete Event Systems (2 Weeks; Chapter 1)**
- 2) Languages and Automata (5 Weeks; Chapter 2)**
 - a. Concepts of Languages and Automata
 - b. Operations on Automata
 - c. Finite-State Automata
 - d. Analysis of Discrete Event Systems
- 3) Supervisory Control (5 Weeks; Chapter 3)**
 - a. Feedback control with Supervisors
 - b. Specifications on Controlled System
 - c. Control with Partial Controllability

d. Nonblocking Control

Prerequisites

I expect that you have knowledge in the following areas:

- 1) **Automata:** The basics of what automata are and how they are used.
- 2) **Math:** The basics in calculus.

Grading

Final

100%

You will be able to use your own copy of the course notes, the recommend textbook, and a dictionary as references on the final exam. All other material will not be permitted. A simple calculator without Wi-Fi capabilities will also be permitted.

It is planned to conduct the final as an in-person examination. However, should it not be feasible, then it will be conducted as a four-hour take-home examination.

Recommended Textbook

The course is based on the following book:

- Christos G. Cassandras and Stéphane Lafortune (2008), *Introduction to Discrete Event Systems*, 2nd edition, Springer: New York, New York, United States of America.