UNIVERSITÄT DUISBURG-ESSEN
Lehrstuhl Steuerung, Regelung
und Systemdynamik
Univ.-Prof. Dr.-Ing. Dirk Söffker

Wintersemester 2024/25

Course	**Control Theory (3L, 1E, 1P)**
Target group	ISE Master Program ME ISE Master Program Automation and Safety, Safe Systems
URL of the course	https://moodle.uni-due.de/course/view.php?id=23822
Lecturer	Univ.-Prof. Dr.-Ing. Dirk Söffker
Assistant	Jonathan Liebeton, M.Sc.
About course	In WiSe 24/25, the course will be realized in person at the university. The coursed is based on the following material (downloadable via Moodle): Lecture and exercise material (pdf) The basis of the course is the specified textbook (> available in the textbook collection). The central teaching materials are available as encrypted PDF documents in the Moodle course. For each lecture unit a raw manuscript is published which can be downloaded in the Moodle course **from the beginning of the course**. This serves to structure/individualize the personal notes. For preparation/postprocessing of the lecture it is strongly recommended ➢ **the previous substance,** ➢ **attending the consultation hours** ➢ **as well as reading the upcoming substance in the given chapters in advance (in the specified textbook/textbook) to work out.**
Material	Moodle: Control Theory - CTH (https://moodle.uni-due.de/course/view.php?id=23822)
Registration in Moodle	The password can be requested via the e-mail address srs-pw@uni-due.de. The subject must contain only the word **CTH**.
Day	Friday
Time	3:00 - 6:30 pm
First course	October 11th, 2024
Last course	January 24th, 2025
Room	SG 135

<table>
<tr><td>Consulting hours</td><td>Thursday, 10.00 - 11.30 am</td></tr>
<tr><td>Prerequisites</td><td>Exam in Control Engineering - strong knowledge in dynamics (SISO, time and frequency domain)</td></tr>
<tr><td>Literature</td><td>Textbooks (> Library):
Ogata, K.: Modern Control Engineering 3. Edition, Prentice H.
Lunze, J.: Regelungstechnik 2, Springer
Ludyk, G.: Theoretische Regelungstechnik Vol 1/2, Springer
Franklin, G.: Feedback Control of Dynamic Systems, 4th ed.</td></tr>
<tr><td>Content</td><td>
<table>
<tr><th>Unit</th><th>Topic:</th><th>Chapter (Ogata):</th><th>Chapter (Lunze) :</th></tr>
<tr><td>1</td><td>State space</td><td>11.1 – 11.5</td><td>1-2.6</td></tr>
<tr><td>2</td><td>Controllability and observability</td><td>11.6 f.</td><td>3</td></tr>
<tr><td>3</td><td>Pole placement</td><td>12.1-12.4</td><td>6</td></tr>
<tr><td>4</td><td>State observers</td><td>12.5-12.6</td><td>8.1-8.2</td></tr>
<tr><td>5</td><td>Design of servo systems / Robust control</td><td>12.7 f.</td><td>4-5
7.1-7.5</td></tr>
<tr><td>6</td><td>Liapunov stability</td><td>13.1-13.3</td><td></td></tr>
<tr><td>7</td><td>Model reference control</td><td>13.4-13.5</td><td></td></tr>
<tr><td>8</td><td>Quadratic optimal problems</td><td>13.6</td><td>7.1-7.5</td></tr>
<tr><td>9</td><td>Advanced approaches</td><td></td><td></td></tr>
<tr><td>10</td><td>Discrete systems / discrete design</td><td></td><td>11-14</td></tr>
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<tr><td>Practical Exercise</td><td>Mandatory, individually graded. See separate announcement.</td></tr>
<tr><td>Exam</td><td>Written exam, closed book, in the examination period.
Bitte beachten Sie die ab SoSe24 geänderten Hinweise zu den zugelassenen Hilfsmitteln bei der Klausur.

Please note the changes to the permitted aids for the exam from SoSe24.</td></tr>
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