

**Module: Digital Control Systems**

<b>Level</b>	Bachelor	<b>Short Name</b>	DCS
<b>Responsible Lecturers</b>	Korff, Alexander, Prof. Dr.-Ing.		
<b>Department, Facility</b>	Electrical Engineering and Computer Science		
<b>Course of Studies</b>	Elektrotechnik - Energiesysteme und Automation, Bachelor		
<b>Compulsory/elective</b>	Compulsory	<b>ECTS Credit Points</b>	5
<b>Semester of Studies</b>	4	<b>Semester Hours per Week</b>	4
<b>Length (semesters)</b>	1	<b>Workload (hours)</b>	150
<b>Frequency</b>	SuSe	<b>Presence Hours</b>	60
<b>Teaching Language</b>	English	<b>Self-Study Hours</b>	90

The following section is filled only if there is **exactly one** module-concluding exam.

<b>Exam Type</b>	Written Exam	<b>Exam Language</b>	English
<b>Exam Length (minutes)</b>	120	<b>Exam Grading System</b>	One-third Grades
<b>Learning Outcomes</b>	Students should be able to: <ul style="list-style-type: none"> <li>• Analyze and simulate the dynamic behavior of control systems.</li> <li>• know the behavior of standard transfer elements and apply them in the context of controlled system analysis</li> <li>• perform basic methods for controller design</li> <li>• use Matlab/Simulink for simulation, analysis and design of control loops</li> <li>• know the special features of digital control systems and be able to design them in principle</li> </ul>		
<b>Participation Prerequisites</b>	Signale und Systeme, Prozedurale Programmierung, Physik, Mathe I + II		

The previous section is filled only if there is **exactly one** module-concluding exam.

<b>Consideration of Gender and Diversity Issues</b>	✗ Use of gender-neutral language (THL standard) ✗ Target group specific adjustment of didactic methods ✗ Making subject diversity visible (female researchers, cultures etc.)		
<b>Applicability</b>			
<b>Remarks</b>			

## Module Course: Digital Control Systems (Lecture)

(of Module: Digital Control Systems)

<b>Course Type</b>	Lecture	<b>Form of Learning</b>	Presence
<b>Mandatory Attendance</b>	no	<b>ECTS Credit Points</b>	4
<b>Participation Limit</b>		<b>Semester Hours per Week</b>	3
<b>Group Size</b>		<b>Workload (hours)</b>	120
<b>Teaching Language</b>	English	<b>Presence Hours</b>	45
<b>Study Achievements ("Studienleistung", SL)</b>		<b>Self-Study Hours</b>	75
<b>SL Length (minutes)</b>		<b>SL Grading System</b>	

The following section is filled only if there is a course-specific exam.

<b>Exam Type</b>		<b>Exam Language</b>	
<b>Exam Length (minutes)</b>		<b>Exam Grading System</b>	
<b>Learning Outcomes</b>			
<b>Participation Prerequisites</b>			

The previous section is filled only if there is a course-specific exam.

<b>Contents</b>	Grundbegriffe der Regelungstechnik, Modellierung und Analyse dynamischer Systeme, Basisübertragungselemente, Standard-PID- Regler, Stabilitätskriterien, Auslegung von PID- Reglern, Kaskadenregelungen
<b>Literature</b>	[1] Serge Zacher, Manfred Reuter: Regelungstechnik für Ingenieure, Springer Vieweg
<b>Remarks</b>	

## Module Course: Digital Control Systems (Practical Training)

(of Module: Digital Control Systems)

<b>Course Type</b>	Practical Training	<b>Form of Learning</b>	Presence
<b>Mandatory Attendance</b>	no	<b>ECTS Credit Points</b>	1
<b>Participation Limit</b>		<b>Semester Hours per Week</b>	1
<b>Group Size</b>	12	<b>Workload (hours)</b>	30
<b>Teaching Language</b>	English	<b>Presence Hours</b>	15
<b>Study Achievements ("Studienleistung", SL)</b>		<b>Self-Study Hours</b>	15
<b>SL Length (minutes)</b>		<b>SL Grading System</b>	

The following section is filled only if there is a course-specific exam.

<b>Exam Type</b>		<b>Exam Language</b>	
<b>Exam Length (minutes)</b>		<b>Exam Grading System</b>	
<b>Learning Outcomes</b>			
<b>Participation Prerequisites</b>			

The previous section is filled only if there is a course-specific exam.

<b>Contents</b>	Messung von Sprungantworten und Bodediagrammen, Identifikation der Regelstrecke, Auslegung von einfachem Drehzahlregler, Positionsregler, Präsentation der Ergebnisse
<b>Literature</b>	[1] <a href="https://matlabacademy.mathworks.com/details/matlab-onramp/gettingstarted">https://matlabacademy.mathworks.com/details/matlab-onramp/gettingstarted</a> [2] <a href="https://matlabacademy.mathworks.com/details/simulink-onramp/simulink">https://matlabacademy.mathworks.com/details/simulink-onramp/simulink</a> [3] <a href="https://matlabacademy.mathworks.com/details/simulink-fundamentals/slbe">https://matlabacademy.mathworks.com/details/simulink-fundamentals/slbe</a> [4] <a href="https://matlabacademy.mathworks.com/details/control-design-onramp-with-simulink/controls">https://matlabacademy.mathworks.com/details/control-design-onramp-with-simulink/controls</a>
<b>Remarks</b>	