Assessment plan for the curriculum of the **Master's** degree programme in Systems & Control, 2026-2027

Programme director: prof. dr. S. (Stephan) Trenn

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1. Vision on assessment

1. Assessment evaluates the student's skills to formulate mathematical models for control systems, to analyze those as well as to propose controller designs.
2. Assessment stimulates the student's ability to recognize which real-world control problems are amenable to existing control theoretical methods and to adjust available methods for the specific constraints and limitations.
3. Assessment stimulates the development of both research and presentation skills in academic and professional contexts.

2. Assessment guidelines

Please explain the general assessment procedures that are used in the programmes. For example, 4-eyes principle in test design, standardised grading forms, rubrics.

1. The formative and summative assessment are designed by the course coordinator in such a way that the assessment covers all the intended learning outcomes of the course.
2. Summative assessments in the form of final exams are designed by the course coordinator and are peer reviewed by the second examiner in order to ensure that the exam assesses the course material representatively and sufficiently.
3. Summative assessments in the form of homework assignments are verified by additional in person discussions.
4. In written assignments the student must explain how literature and software tools have been used.

3. Learning outcomes of the degree programme

Learning outcomes for the degree programme, further specified learning outcomes (where relevant) and/or specified for tracks within the degree programme. Please add extra rows if necessary.

	Learning Outcome *At the end of the programme, the graduate …*
	Knowledge and Understanding
1.1	Has profound knowledge of the generic concepts of Systems and Control, including the necessary mathematics and engineering concepts, its relevance in technology, and computational aspects, at a level which permits admission to a higher level post-graduate programme
1.2	Has understanding of the disciplines that are relevant to the field of Systems and Control (such

	as electrical and mechanical engineering, robotics, physics) at a level which permits admission to a higher level post-graduate programme
1.3	Has operational knowledge and design/development skills in the field of Systems and Control
	Application of Knowledge and Understanding
2.1	Has critical awareness and is capable of performing analysis, design, modeling and simulations within the context of complex engineering problems and networks, using methods from the field of systems and control
2.2	Is capable of applying his/her in-depth knowledge and practical skills to solve complex problems with respect to technological dynamical systems taking into consideration their external interaction with the environment as well as the internal interactions between their subsystems
2.3	Is capable of carrying out research at academic level, aimed at identifying, formulating and solving complex problems within the field of systems and control
2.4	Is capable of developing and designing new methods, algorithms and control strategies using specific knowledge from the field of system and control while optimizing processes and resources
2.5	Is capable of analyzing data relevant to control systems and networks and retrieve information from the literature and other sources of information
2.6	Is capable to write scientific reports
2.7	Has developed an attitude aimed at seeking new innovative applications
2.8	Has experience in the application of systems and control in an industrial environment or in a research environment abroad
2.9	Is capable of collaborating in a (multi-disciplinary) research and design team
	Judgement
3.1	Is capable of judging his/her and others' actions within a scientific context, taking economic, societal and ethical aspects into account
3.2	Is able to act in a responsible manner in regards to sustainability, economy and social welfare
3.3	Is able to draw conclusions on the basis of limited or incomplete information, and is able to realize and formulate the limitations of such conclusions
3.4	Is capable of working independently as well as part of a team to solve technological problems
3.5	Is able to explain scientific information and defend scientific outcomes within his/her research field
	Communication Skills
4.1	Is capable of communicating in the English language, clearly and effectively, verbally and in writing, on his/her subject and relevant applications, at a level which is understandable to experts and non-experts
4.2	Is able to communicate scientifically with experts from different disciplines

4.3	Is capable of using modern communication tools
	Learning Skills
5.1	Is capable of addressing issues inside as well as outside his/her main subject area, and thereby gaining new knowledge and skills
5.2	Is able to recognize potential systems and control applications in recent advances in science and technology
5.3	Has the ability to learn independently and engage in life-long learning

4. Overview of assessment methods, test moments for course units, and examiners

This table shows all the course units for each year of the programme and assessment methods. Please add extra rows if necessary.

Year	**Period**	**Course**	**EC**	**Assessment methods**	**Does (part of the) assessment have a formative function?**	**Test moment(s)** (e.g. mid-term, continuous assessment, exam week, etc)	**First examiner**	**Second examiner**
1	1a	Advanced Systems and Control (WMSC001-05)	5	WE, P, AST	Yes	Exam week, continuous (homework)	prof. dr. S. Trenn	dr. S. Ahmed
1	1a	Robust Control (WMMA021-05)	5	See MSc AM				
1	1a	Multibody and Non-Linear Dynamics (WMME009-05)	5	See MSc ME				
1	1a	Robotics and Automation (WMIE038-05)	5	See MSc IEM				
1	1a	Advanced Vibration (WMME030-05)	5	See MSc ME				
1	1a	Robotic State Estimation (WMCS040-05)	5	See MSc CS				
1	1a	AI Applications in Engineering (WMME036-05)	5	See MSc ME				
1	1a	Optimization for Smart Systems (WMIE039-05)	5	See MSc IEM				
1	1a + 1b	Systems and Control (Mastermath) (WMMA003-06)	6	See Mastermath regulations				
1	1b	Fitting Dynamical Models to Data (WMIE007-05)	5	See MSc IEM				
1	1b	Calculus of Variations and Optimal Control (25/26) (WMMA056-05)	5	See MSc AM				
1	1b	Data-Based Analysis and Control (25/26) (WMMA058-05)	5	See MSc AM				

Year	Period	Course	EC	Assessment methods	Does (part of the) assessment have a formative function?	Test moment(s) (e.g. mid-term, continuous assessment, exam week, etc)	First examiner	Second examiner
1	1b	Model Reduction for Control (24/25) (WMMA062-05)	5	See MSc AM				
1	1b	Finite Elements Methods and Applications (WMMA051-05)	5	See MSc AM				
1	1b	Intelligent Mobile Perception in Practice (WMCS042-05)	5	See MSc CS				
1	2a	Nonlinear Control Systems (WMSC003-05)	5	WE	No	Exam week	prof. dr. ir. B. Besselink	prof. dr. ir. M. Cucuzzella
1	2a	Analysis and Control of Smart Systems (WMIE015-05)	5	See Msc IEM				
1	2a	Systems Engineering (WMIE021-05)	5	See MSc IEM				
1	2a	Engineering Design Integration (WMIE029-05)	5	See MSc EE				
1	2a	Multimodal Mobile Sensing (WMCS042-05)	5	See MSc CS				
1	2a	TinyML: Machine Learning for Embedded Devices (WMME034-05)	5	See MSc ME				
1	2a	Optimization under Uncertainty (WMIE037-05)	5	See MSc IEM				
1	2b	Integration Project (WMSC002-05)	5	R, P, PR	No	Exam week	dr. S. Ahmed	prof. dr. S. Trenn
1	2b	CFD for Engineers (WMCE013-05)	5	See MSc CE				
1	2b	Data-driven Optimization (WMME011-05)	5	See MSc ME				
1	2b	Opto-mechatronics (WMME015-05)	5	See MSc ME				

Year	Period	Course	EC	Assessment methods	Does (part of the) assessment have a formative function?	Test moment(s) (e.g. mid-term, continuous assessment, exam week, etc)	First examiner	Second examiner
2	-	Internship/Design Project (WMSC901-20)	20	R, P	No	Continuous	See list below (section 6)	
2	-	Research Project (WMSC902-40)	40	R, P	No	Continuous	See list below (section 6)	

The abbreviations for the relevant teaching methods are explained in the legend of the table.
Examples of assessment methods include:

- *Written Exam (WE)*
- *Multiple Choice (MC)*
- *Oral Exam (OR)*
- *Report (R)*
- *Presentation (P)*
- *Practical Work (PR)*
- *Assignment (AST)*

The abbreviations for other master programmes are as follows:
- MSc AM: Applied Mathematics
- MSc CE: Chemical Engineering
- MSc IEM: Industrial Engineering and Management
- MSc ME: Mechanical Engineering
- MSc EE: Energy and Environmental Sciences

5. Relationship between course units and details of the learning outcomes

Please note in the table below the course units per block in the programme. Indicate which learning outcomes are assessed in which courses by adding an X in the relevant cell. Please add extra rows if necessary.

An X means that the learning outcome is explicitly assessed (not merely addressed) in the course.

		Learning outcomes of the degree programme																						
		1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.1	3.2	3.3	3.4	3.5	4.1	4.2	4.3	5.1	5.2	5.3
Period	**Course**	**Year 1 –compulsory courses**																						
1a	Advanced Systems and Control (WMSC001-05)	X									X							X	X			X	X	
1a	Robust Control (WMMA021-05)	X												X		X			X					
1b	Fitting Dynamical Models to Data (WMIE007-05)	X	X	X					X							X			X					
2a	Nonlinear Control Systems (WMSC003-05)	X	X	X	X	X	X	X			X		X					X	X				X	
2b	Integration Project (WMSC002-05)			X		X		X	X	X			X			X	X	X	X			X		
Period	**Course**	**Year 1 Electives (if applicable)**																						
1a	Multibody and Non-Linear Dynamics (WMME009-05)	X	X	X	X	X		X			X					X			X	X			X	

		Learning outcomes of the degree programme																						
		1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.1	3.2	3.3	3.4	3.5	4.1	4.2	4.3	5.1	5.2	5.3
1a	Robotics and Automation (WMIE038-05)	X	X	X	X	X		X			X					X			X	X				
1a	Advanced Vibration (WMME030-05)		X	X	X	X			X				X			X			X	X		X	X	
1a	Robotic State Estimation (WMCS040-05)	X	X	X	X	X			X				X			X				X			X	
1a	AI Applications in Engineering (WMME036-05)		X	X	X	X		X	X		X		X			X	X	X	X	X	X	X	X	
1a	Optimization for Smart Systems (WMIE039-05)	X	X		X	X		X						X	X				X	X				
1a + 1b	Systems and Control (Mastermath) (WMMA003-06)	X				X	X	X	X	X			X					X	X		X		X	
1b	Calculus of Variations and Optimal Control (25/26) (WMMA056-05)	X			X			X											X					
1b	Data-Based Analysis and Control (25/26) (WMMA058-05)	X		X	X	X		X	X										X					

		Learning outcomes of the degree programme																						
		1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.1	3.2	3.3	3.4	3.5	4.1	4.2	4.3	5.1	5.2	5.3
1b	Model Reduction for Control (24/25) (WMMA062-05)	X		X	X		X	X	X				X					X	X	X			X	
1b	Finite Elements Methods and Applications (WMMA051-05)		X		X	X							X			X			X			X		X
1b	Intelligent Mobile Perception in Practice (WMCS042-05)	X	X	X	X	X			X				X			X				X			X	
2a	Analysis and Control of Smart Systems (WMIE015-05)	X	X	X	X	X		X						X	X				X	X			X	
2a	Systems Engineering (WMIE021-05)	X		X	X	X		X	X		X		X	X	X	X	X		X	X	X	X	X	X
2a	Engineering Design Integration (WMIE029-05)	X	X	X	X	X			X				X			X				X			X	
2a	Multimodal Mobile Sensing (WMCS042-05)	X	X	X	X	X			X				X			X				X			X	
2a	TinyML: Machine Learning for	X	X	X	X	X			X				X			X				X			X	

		Learning outcomes of the degree programme																						
		1.1	1.2	1.3	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.1	3.2	3.3	3.4	3.5	4.1	4.2	4.3	5.1	5.2	5.3
	Embedded Devices (WMME034-05)																							
2a	Optimization under Uncertainty (WMIE037-05)	X		X	X			X											X					
2b	CFD for Engineers (WMCE013-05)		X		X	X	X			X						X		X	X	X	X	X		X
2b	Data-driven Optimization (WMME011-05)	X			X			X						X		X			X					
2b	Opto-mechatronics (WMME015-05)	X	X	X	X	X		X			X								X	X				
Period	**Course**	**Year 2 compulsory courses**																						
-	Internship/ Design Project (WMSC901-20)			X		X		X	X	X		X	X			X	X	X	X		X	X		
-	Research Project (WMSC902-40)	X	X	X			X		X	X	X		X	X				X	X		X	X	X	X

6. Examiners for Internship/Design Project and Research Project Systems and Control

dr. S. Ahmed
prof. dr. D. Bauso
prof. dr. ir. B. Besselink
prof. dr. M.K. Camlibel
prof. dr. M. Cao
dr. A.K. Cherukuri
prof. dr. ir. M. Cucuzzella
prof. dr. M. GhandchiTehrani
dr. B. Haghighat
prof. dr. B. Jayawardhana
prof. dr. N. Monshizadeh
dr. M. Muñoz Arias
prof. dr. C. de Persis
prof. dr. J.G. Peypouquet
prof. dr.ir. J.M.A. Scherpen
prof. dr. S. Trenn
dr. ir. H.J. van Waarde
prof. dr. E. Wilhelm

On an individual basis the Board of Examiners can allow examiners of other degree programmes to act as examiner for the research project of the master's degree programme in Systems and Control as well.