

**Study and examination regulations for master courses of
the Aalen University of Applied Sciences (SPO 31)**

from 18 July 2016

Version of 7 April 2017

On the basis of Art. 8 paragraph 5 in junction with Art. 32 of the law about the universities in Baden-Württemberg (state university law, Landeshochschulgesetz - LHG) as amended on 1 January 2005 (GBl. p.1), last amended by article 1 of the law of 1 April 2014 (GBl. p.99) as applying from 9 April 2004, the senate of the Aalen University of Applied Sciences - Engineering and Business - has decided on 8 July 2016 about the following examination regulations. By order of 18 July 2016, the dean has approved of these study and examination regulations (SPO 31).

On 30 November 2016, the senate of the Aalen University of Applied Sciences– Engineering and Business - has amended the study and examination regulations for master courses of studies (SPO 31) as follows. By order of 9 December 2016, the dean has approved of this amendment to the study and examination regulations.

On 8 February 2017, the senate of the Aalen University of Applied Sciences– Engineering and Business - has amended the study and examination regulations for master courses of studies (SPO 31) as follows. By order of 1 March 2017, the dean has approved of this amendment to the study and examination regulations.

On 29 March 2017, the senate of the Aalen University of Applied Sciences– Engineering and Business - has amended the study and examination regulations for master courses of studies (SPO 31) as follows. By order of 7 April 2017, the dean has approved of this amendment to the study and examination regulations.

Art. 41 Master of Polymer Technology (PTC)

I - Preamble – qualification objectives

The Polymer Technology master course of studies deals with the field of Plastics in an academic manner.

The subjects of the master course of studies are characterised by a focus on engineering in the modules. Some subjects refer to complex physical relationships in polymer physics, rheology, process technology or polymer analytics based on advanced mathematical descriptions (such as state differential equations, tensor computations). Knowledge of experimental physics, mathematics, thermodynamics and fluid mechanics and other fields is assumed, so that a broad target group of university applicants is addressed.

Scientific enhancement delimits the Polymer Technology master course of studies from the Plastics bachelor course of studies.

Building on the level of a technological bachelor's course of studies (especially referring to the Plastics programme), the students of the Polymer Technology master course of studies acquire the following additional skills:

- Students develop a high degree of capacity for abstract thinking.
- They are able to improve existing processes based on lectures on processing and testing and to develop new processes. The scientific tools acquired in the bachelor's studies are enhanced thereby.
- Students from adjoining bachelor's courses of studies have to close any knowledge gaps autonomously.
- Labs and simulation exercises require a high degree of autonomy.
- Students are able to plan, perform and assess experiments mostly autonomously. This approach clearly contrasts with the bachelor's level.
- The discussion of test results professionalizes the academic terminology, i.e. the students must suggest, present, discuss and defend their own assessment strategies.

Within the scope of the master studies, knowledge and skills are thus taught that enable the graduates to analyse and explain sophisticated issues of plastics engineering, to draw conclusions and to develop new solutions on their own and in teams.

Graduates are thus enabled to examine and assess advanced engineering issues and problems in projects on their own or as part of an international team, using modern simulation methods and other tools, and to contribute to improvements and innovations by suggesting solutions.

The academic Polymer Technology master programme provides graduates with profound technical knowledge in the whole area of Plastics, whether in English or in German. Students can systematically analyse sophisticated issues of plastics engineering, develop problem-solving strategies and use them to compile potential solutions. They are academically enabled to argue with team members, superiors and experts and to defend their position. They can carry out projects on their own.

Graduation from the master course of studies qualifies for a job in engineering, especially in Plastics, which is both a distinct discipline of engineering and an integral part of mechanical engineering, automotive and aerospace technology, medical technology or environmental studies as well as the consumer goods and sports industries.

Graduates of Plastics typically work in material or product development or in product simulation, treatment process development, testing technology, testing, quality assurance, damage analytics, procedure development, manufacturing and recycling in all areas of science and industry where plastics engineering is required.

The ability to engage in civil society is anchored in the 'Intercultural Communication' module. Here the students acquire intercultural, soft and general skills. The graduates are enabled, for example, to discuss socio-cultural subjects and to develop intercultural sensitivity.

II – Study structure and scope

- (1) The Faculty of Mechanical Engineering/Materials offers a Master of Science in Polymer Technology to students with a bachelor degree or a diploma. The master course of studies includes a total of 3 semesters with 46-52 hours per week.
- (2) Participation in at least 2 excursions is compulsory.
- (3) Time and structure of the studies, the lectures with hours per week, modules with exams and their weighting for determining grades and proper credit points (CPs) emerge from the following table.
- (4) The exams of the students may be produced in either German or English. Written examinations are excluded from the 'Intercultural Communication' module: here, the chosen language has to be applied.
- (5) The Studium Generale has no distinct workload defined in the curriculum because it is integrated in the module 14007 'Intercultural Communication' treating socio-political and socio-cultural subjects in the regular course.
- (6) Master-thesis
The provisions of Art.23 et seq. apply to these statutes.
The master thesis shall be audited by two examiners. One examiner must be in charge of the master thesis. External PICs may not be assigned as first consultants.
- (7) The master report and certificate are issued in German. The diploma supplement and the transcript of records are additionally issued in German and English.
- (8) The term of the full programme is up to 6 semesters including the master thesis. If this term is exceeded, admission to the studies will expire. Admission and the right to participate in examinations will also expire if the student has achieved less than 15 ECTS points after the 1st semester or less than 40 ECTS points after the 2nd semester unless the student is not to blame for failure to achieve the minimum value.

Curriculum: Master of Science in Polymer Technology

No.	Module Lecture	Type	Semester			CP
			WS	SS	WS/SS	
14001	Polymer Materials					5
14101	Polymer Materials	V	4			5
14002	Polymer Testing					5
14102	Polymer Testing	V, Ü	2			5
14103	Polymer Testing Lab	L	2			
14003	Advanced Polymer Processing - Extrusion					5
14104	Extrusion Technology	V, Ü	2			5
14105	Extrusion Lab	L	2			
14004	Polymer Physics and Rheology					5
14106	Polymer Physics	V, Ü	2			5
14107	Advanced Rheology	V, Ü	2			
14005	Advanced Polymer Processing - Injection Moulding					5
14108	Injection Moulding Advanced Technologies	V, Ü	2			5
14109	Injection Moulding Lab	L	2			
14006	Polymer Design and Mould Design					5
14110	Polymer Design	V, Ü	2			5
14111	Mould Design	V, Ü	2			
14007	Intercultural Communication*					5
14201	Intercultural Communication - English	V, Ü		4		5
14202	Intercultural Communication - German	V, Ü		8		5
14008	Multi Materials Manufacturing					5
14203	Multilayer Technology	V, Ü, L		2		5
14204	Design of Experiments DOE	V, Ü, L		2		
14009	Polymer Thermal Analysis					5
14205	Thermal Analysis Methods	V, Ü		2		5
14206	Thermal Analysis Lab	L		2		
14010	Advanced Process Simulation					5
14207	Process Simulation	V, Ü		2		5
14208	Process Simulation Lab	L		2		

Master thesis

* Students whose native tongue is German have to select field 14201.

* Students whose native tongue is not German have to select field 14202.

No.	Module Lecture	Type	Semester			CP
			WS	SS	WS/SS	
	Two compulsory modules (two of ten)					
14801	Advanced Mould design				Master thesis	5
14301	Advanced Mould design	V, Ü		2		5
14302	CAD Mould design	L		2		
14801	Advanced Mould Design					5
14301	Advanced Mould Design	V, Ü		2		5
14302	CAD Mould Design	V, Ü		2		
14802	Modelling and Control					5
14303	Material Modelling	L		2		5
14304	Control Engineering					
14803	Scientific Project	V, Ü		4		5
14305	Scientific Project					5
14804	Polymers in Application	V, Ü		4		5
14306	Polymers in Application					5
14805	Leichtbau	V, Ü		4		5
14307	Composites					5
14807	Strukturmechanik	V		4		5
14309	Strukturmechanik					5
14808	Robotik	V		2		5
14310	Robotik	L, P		2		5
14809	Produktentwicklung					5
14311	Digitale Produktentstehung u. Fertigung	V		4	5	
14312	Digitale Produktentstehung u. Fertigung –					
14810	Physikalische Modellbildung	V, Ü, P		4	5	
14999	Master thesis				X	30
9999	Master thesis	P			X	30
	Total SWS		24	22-28		
	Total CP		30	30	30	90
	Total exams		6	4+2 WP	MA	

* WP= Compulsory optional area, MA= Master thesis