§ 38 Master**'s** Program Technology Management and Optimization

(1) Structure of studies

The consecutive master's program Technology Management and Optimization comprises three semesters and builds on the bachelor's degree programs in Industrial Engineering (Technology Management) and Technology-Management or Technology-Development. Admission is still possible with a university degree in industrial engineering or related subjects from other universities or a university degree in technical or scientific fields. Further details are regulated by the admission statutes of Ravensburg-Weingarten University of Applied Sciences (RWU) for the Master's program in Technology Management and Optimization in their current version.

For the successful completion of the consecutive study program, courses as well as the associated study and examination achievements to the extent of 90 ECTS are required. These are shown in tables 1 to 3. The degree is completed in the 3rd semester with the Master's examination.

Graduates of Bachelor's degree programs whose studies comprise less than 210 ECTS must complete the remaining ECTS at the latest by the time they register for the Master's thesis in accordance with the admission regulations of Ravensburg-Weingarten University (RWU) for the Master's program Technology-Management and Optimization in its current version.

(2) Course of studies

The master's program in Technology Management and Optimization (TMO) can be studied with three profile directions:

- a profile direction with a technical orientation (TMO Corporate Optimization) (UO)),
- a profile direction with a development-oriented orientation (TMO Development and Technological Innovation) (EN)) and
- a profile with an international orientation (TMO International and Entrepreneurship) (IE)), which requires at least one semester of study at a foreign partner university.

All profile are completed with a Master's thesis.

The selection of the profiles takes place after the beginning of the study by registration in the examination office.

The study program uses modern didactic forms of learning. The active participation of the student is a mandatory prerequisite for the acquisition and proof of competence.

(3) Courses and examinations

The courses required for successful completion as well as the associated course and examination achievements are shown in tables 1, 2 and 3. The following abbreviations are used for this purpose:

Type of course		Type of exam		Further abbreviations	
V	Lecture	K(xx)	Written examination duration of xx minutes	SWS	Number of semester hours per week
P	Practical course, exercises	M	Oral examination	ECTS	Number of credit points required (§3)
VP	Lecture with integrated exercises	R	Seminar paper and presentation	E	Language of instruction is English
Ü	Exercises	PA	Practical work in combination with tests	D	Language of instruction is German
S	Seminar	PF	Portfolio		
PR	Project work	D	Documentation		
L	Laboratory/practical course	H	Term paper		
PB	Practical experience report				
MT	Master's thesis				

The examination requirements for the courses at foreign partner universities are determined by the partner university. Quality assurance on the part of Ravensburg-Weingarten University takes place via learning agreements. The crediting of the study work done abroad by students enrolled at Ravensburg-Weingarten University is done according to the guidelines for the recognition of study work done abroad by students enrolled at Ravensburg-Weingarten University in their currently valid version.

The respective number of semester hours per week (SWS) specified in Tables 1, 2 and 3 is defined in each case as the maximum number of attendance hours. The details for the respective course are regulated by the module handbook.

Compulsory attendance in courses is decided for the individual case by the faculty council for the respective semester. In the case of seminars, attendance is compulsory for the issue of topics in the opening event, irrespective of the above regulation; participation in a seminar is no longer possible if the student did not attend the opening event for the issue of topics, unless the student is not responsible for the failure to attend.

The language of instruction is German or English, the details are regulated by the module handbook. German-language courses can also be offered in English on a semester-by-semester basis in agreement with the dean of studies. This is to be announced by the lecturer at the latest at the beginning of the lecture.

The language of instruction in Module 14 of the profile International and Entrepreneurship (IE), which is studied abroad at a partner university, is English. Therefore, good English language skills must be

demonstrated by taking one of the following tests when taking this profile:

- OPT with at least 80 points
- Oxford B2
- Cambridge B 2 or FCE
- IAELTS with 6.5
- TOEFL with 90 points.

The test must not have been taken more than two years ago.

As a rule, the examinations are conducted in the respective language of instruction. In agreement with the dean of studies, the examination may also be taken in German or English. This must be announced by the lecturer at the beginning of the lecture at the latest.

In addition to the examinations listed in tables 1, 2 and 3, the lecturer may, at his or her own discretion, specify voluntary examinations to be taken during the course of study as partial module examinations. The determination as well as the type, scope and weighting of the partial module examinations are to be announced to the students at the beginning of the lecture, usually in the first lecture, and announced by the faculty by means of a notice. The assessment of the partial module examinations is included in the module examination with their respective weight.

(4) Elective courses

Students can freely choose elective courses amounting to 10 ECTS. The elective courses must be taken from the graded range of courses offered by Ravensburg-Weingarten University of Applied Sciences, another German college/university and/or as part of a semester abroad.

As a rule, only subjects from Master's programs can be chosen as electives. Elective courses may not be substantially identical in content to compulsory and already taken elective modules. In case of doubt, the chairperson of the Examination Board decides on the creditability of an elective course.

(5) **Master's** Thesis

In addition to § 10 of the General Part of the Study and Examination Regulations, the following regulations apply:

The Master's thesis is usually written at Ravensburg-Weingarten University of Applied Sciences, but can also be written in cooperation with a company, a research institution or at a partner university abroad. It is to be written in German or English. The individual topics are related to the contents of the chosen profile fields. After completion, the results of the Master's thesis are presented in a public colloquium at Ravensburg-Weingarten University.

The topic, task and scope of the Master's thesis are to be limited by the task-setter in such a way that the work can be completed in approximately 600 working hours, corresponding to 20 ECTS. The thesis must be submitted no later than six months after the registration date either in printed and electronic form to the examination office of Ravensburg-Weingarten University or purely electronically via a digital submission system provided by the faculty.

The master's seminar serves to reflect on the study contents of the master's study program as well as their interconnectedness against the background of the master's thesis and is conducted by the supervisor of the master's thesis.

Table 1: Profile Company Optimization (TMO UO)

Technology Management and Optimization Profile: Company Optimization (TMO UO)			Assigned semester, ECTS and SWS						Type of examination
Modules	Courses	Language	1 (winter)		2 (summer)		3 (winter)		graded
			ECTS	SWS	ECTS	SWS	ECTS	SWS	
Module 1 Product Engineering 1	Data Mining	German	3	2					PF
	Modern Development Methodology	German	2	2					
Module 2 Product Engineering 2	Functional Materials	German	3	2					K90 or PF
	New Material and Material Trends	German	2	2					
Module 3 Product Engineering 3	Semiconductors and Materials	German							M or PF
	Optical Systems	German							
Module 4 Product Engineering 4	Cyberphysical Systems	German							K90 or PF
Module 5 Product Engineering 5	Machine Vision	German							PA
	Autonomous Systems	German							
Module 6 Product Engineering 6	Digital Transformation Design	German							PF
Module 7 Production Optimization 1	Automation	German			5	4			K60 or PF
Module 8 Production Optimization 2	Analysis and Optimization of Production Systems	German	3	2					K90
	Factory Planning	German	2	2					
Module 9 Production Optimization 3	Digital Planning of Production Systems	German			3	2			PF
	Simulation of Production Systems	German			2	2			
Module 10 Technology Management	Technology Foresight and Future Studies	German			3	3			PF
	Technology Development	German / English			2	2			
Module 11 Process Optimization	Lean Management	German			3	2			PF
	Process Design and Optimization	German			2	2			
Module 12 Business Management 1	Business Development	German	3	2					PF
	Entrepreneurship in the Technological Environment	German	2	2					
Module 13 Business Management 2	Management Systems Cost Management	German / English			5	4			PF
Module 14 Entrepreneurship	Foreign Studies with Partner Universities	English							
Module 15 Optimization Methods 1	Optimization with Matlab	German	5	4					K60
Module 16 Optimization Methods 2	Design of Experiments	German			5	4			M
Module 17 Optimization Methods 3	Artificial Intelligence in Business Processes	German	5	4					Documentation or PF
Module 18 Optimization Methods 4	Machine Learning	German							M or K60
Elective Module 19 Elective Courses for a Specialisation in Industrial Engineering	Elective Courses	German / English					10		
Master's thesis	Master's seminar and Master's thesis	German / English					20		MT
Total			30	24	30	25	30		

Table 2: Profile Development and Technological Innovation (TMO EN)

Technology Management and Optimization Profile: Development and Technological Innovation (TMO EN)			Assigned semester, ECTS and SWS						Type of examination
Modules	Courses	Language	1 (winter)		2 (summer)		3 (winter)		graded
			ECTS	SWS	ECTS	SWS	ECTS	SWS	
Module 1 Product Engineering 1	Data Mining	German	3	2					PF
	Modern Development Methodology	German	2	2					
Module 2 Product Engineering 2	Functional Materials	German	3	2					K90 or PF
	New Material and Material Trends	German	2	2					
Module 3 Product Engineering 3	Semiconductors and Materials	German			3	2			M or PF
	Optical Systems	German			2	2			
Module 4 Product Engineering 4	Cyberphysical Systems	German	5	4					K90 or PF
Module 5 Product Engineering 5	Machine Vision	German			3	2			PA
	Autonomous Systems	German			2	2			
Module 6 Product Engineering 6	Digital Transformation Design	German			5	4			PF
Module 7 Production Optimization 1	Automation	German			5	4			K60 or PF
Module 8 Production Optimization 2	Analysis and Optimization of Production Systems	German							K90
	Factory Planning	German							
Module 9 Production Optimization 3	Digital Planning of Production Systems	German							PF
	Simulation of Production Systems	German							
Module 10 Technology Management	Technology Foresight and Future Studies	German			3	3			PF
	Technology Development	German / English			2	2			
Module 11 Process Optimization	Lean Management	German							PF
	Process Design and Optimization	German							
Module 12 Business Management 1	Business Development	German							PF
	Entrepreneurship in the Technological Environment	German							
Module 13 Business Management 2	Management Systems	German / English							PF
	Cost Management								
Module 14 Entrepreneurship	Foreign Studies with Partner Universities	English							
Module 15 Optimization Methods 1	Optimization with Matlab	German	5	4					K60
Module 16 Optimization Methods 2	Design of Experiments	German			5	4			M
Module 17 Optimization Methods 3	Artificial Intelligence in Business Processes	German	5	4					Documentation or PF
Module 18 Optimization Methods 4	Machine Learning	German	5	4					M or K60
Elective Module 19 Elective Courses for a Specialisation in Industrial Engineering	Elective Courses	German / English					10		
Master's thesis	Master's seminar and Master's thesis	German / English					20		MT
Total			30	24	30	25	30		

Table 3: Profile International and Entrepreneurship (TMO IE)

Technology Management and Optimization Profile: International and Entrepreneurship (TMO IE)			Assigned semester, ECTS and SWS						Type of examination
Modules	Courses	Language	1 (summer)		2 (winter)		3 (summer)		graded
			ECTS	SWS	ECTS	SWS	ECTS	SWS	
Module 1 Product Engineering 1	Data Mining	German							PF
	Modern Development Methodology	German							
Module 2 Product Engineering 2	Functional Materials	German							K90 or PF
	New Material and Material Trends	German							
Module 3 Product Engineering 3	Semiconductors and Materials	German							M or PF
	Optical Systems	German							
Module 4 Product Engineering 4	Cyberphysical Systems	German							K90 or PF
Module 5 Product Engineering 5	Machine Vision	German							PA
	Autonomous Systems	German							
Module 6 Product Engineering 6	Digital Transformation Design	German							PF
Module 7 Production Optimization 1	Automation	German	5	4					K60 or PF
Module 8 Production Optimization 2	Analysis and Optimization of Production Systems	German							K90
	Factory Planning	German							
Module 9 Production Optimization 3	Digital Planning of Production Systems	German	3	2					PF
	Simulation of Production Systems	German	2	2					
Module 10 Technology Management	Technology Foresight and Future Studies	German	3	3					PF
	Technology Development	German / English	2	2					
Module 11 Process Optimization	Lean Management	German	3	2					PF
	Process Design and Optimization	German	2	2					
Module 12 Business Management 1	Business Development	German							PF
	Entrepreneurship in the Technological Environment	German							
Module 13 Business Management 2	Management Systems	German / English	5	4					PF
	Cost Management								
Module 14 Entrepreneurship	Foreign Studies with Partner Universities	English			30				
Module 15 Optimization Methods 1	Optimization with Matlab	German							K60
Module 16 Optimization Methods 2	Design of Experiments	German	5	4					M
Module 17 Optimization Methods 3	Artificial Intelligence in Business Processes	German							Documentation or PF
Module 18 Optimization Methods 4	Machine Learning	German							M or K60
Elective Module 19 Elective Courses for a Spezialisation in Industrial Engineering	Elective Courses	German / English					10		
Master's thesis	Master's seminar and Master's thesis	German / English					20		MT
Total			30	25	30		30		