Study and Examination Regulations for the Master Programme of Mechatronic and Cyber-Physical Systems at the Deggendorf Institute of Technology Dated 1st October 2018

On the basis of Art. 13 Para. 2 Clause 2, 58 Para. 1, 61 Para. 2 Clause 1 of the Bavarian University and College Act (BayHSChG) of 23rd May 2006 (BayRS 2210-1-1-K), last amended by § 1 of the Act of 19.12.2017, (GVGl. p. 566ff), the Deggendorf Institute of Technology enacts the following by-laws:

§ 1
Aim of the study programme

(1) The Master programme of Mechatronic and Cyber-Physical Systems (MCS) is intended to enable graduates of the Diploma or Bachelor programme to substantiate the knowledge they have acquired so far with theoretical knowledge so as to be particularly well-equipped to meet the requirements of modern research and development tasks.

(2) [1]The programme deals with what is taught in a Bachelor or Diploma programme in greater depth. [2]The aim is to enable graduates to work creatively in research and development departments. [3]Particularly qualified students should also acquire the theoretical foundations that will enable them to obtain a doctorate or to work in scientific fields.

§ 2
Structure of the programme

(1) The programme comprises three theory semesters and concludes with the Master thesis.

(2) [1]Lectures are conducted in English. [2]Examination papers are drawn up in English.

§ 3
Qualification for the programme

(1) [1]Qualification for the Master programme of Mechatronic and Cyber-Physical Systems is demonstrated by completing an undergraduate programme at a domestic or foreign university with a minimum of 210 ECTS credits in the fields of industrial engineering, engineering physics, mechanical engineering, electrical engineering, mechatronics or a degree which is equivalent to such a university degree. [2]The Examination Committee decides on the equivalence of degrees.

(2) Additionally, proof of the following language skills should be furnished for this programme:

- Knowledge of the English language at level C1 according to the Common European Framework of Reference for Languages.
- Knowledge of the German language at level B2 according to the Common European Framework of Reference for Languages.

Regarding the proof, the regulations set out in § 3 of the framework examination regulations for additional training in foreign languages and general academic elective courses of the Deggendorf Institute of Technology shall apply as amended.

§ 4
Proof of ECTS credits not yet obtained

[1]If applicants provide evidence of an admission substantiating university degree, for which less than 210 ECTS credits but at least 180 ECTS credits have been awarded or are to be regarded as equivalent, then proof of the ECTS credits not yet obtained is a prerequisite for passing the master examination. [2]ECTS credits not yet obtained, which must be obtained by the start of the third semester, can be proven upon request to the Examination Committee by completing an additional internship or by participating in relevant university courses. [3]The proof can be provided only once for each variant. [4]A maximum of 30 ECTS credits can be proven. [5]The following conditions apply for the proof:

1. Internship:
   Successful completion of a relevant internship in the fields of industrial engineering, engineering physics, mechanical engineering, electrical engineering or mechatronics lasting at least 20 weeks.

2. University courses:
   [1]University courses must stem from the subject-relevant undergraduate courses provided by the university. [2]The applicant must consult the responsible student advisor in advance. The advisor works out an individual concept together with the applicant.

§ 5
Modules and proof of performance

(1) [1]The programme comprises modules that can be composed of thematically-related courses. [2]Each module is assigned ECTS credits that take into account the time required by students to complete the module.

(2) [1]The compulsory and elective modules, number of hours, form of teaching, exams and ECTS credits are set out in the annex to these by-laws. [2]Regulations are supplemented by the curriculum for the subject-specific elective modules.

(3) [1]All courses comprise compulsory modules, elective modules or optional modules:

1. Compulsory modules are binding for all students.
2. [1]Elective modules are offered as alternatives. [2]Students have to select certain modules from these in accordance with these study and examination regulations. [3]Selected modules are treated as compulsory modules.
3. [1]Optional modules are modules that are not mandatory for achieving the study objective. [2]Students can additionally choose these from the courses offered by the university.

(4) [1]There is no claim that the elective and optional modules will actually be offered. [2]Likewise, there is no claim that the accompanying courses will be held when the number of participants is insufficient.

§ 6
Curriculum

[1]The responsible faculty draws up a curriculum to safeguard the range of courses and to inform the students. Details of the course of studies are derived from this curriculum. [2]The curriculum is decided by the Faculty Council and must be announced within the university before the semester starts. [3]Changes or new regulations must be announced at the latest at the beginning of the lecture period of the semester in which these changes are to be implemented for the first time. In particular, the curriculum contains regulations and information regarding

1. the time distribution of semester periods per week per module and study semester including ECTS credits,
2. the description of compulsory and elective modules, as well as the weekly semester hours, form of teaching, study objectives and course content of these modules,
3. subject-specific elective modules with their number of hours,
   the course form in individual modules, if they have not been definitively set out in the annex.

§ 7
Assessment of examination performance, overall examination grade

(1) [1]There is an examination for each module. [2]If a module examination consists of several examination performances, the module grade is calculated from the arithmetic mean of the individual examination performances, which is rounded off to one decimal place. [3]Individual examination performances are weighted according to the allotted ECTS credits.

(2) [1]If a module examination consists of several examination performances, the grade "nicht ausreichend" (fail) in one partial examination cannot be compensated by a better grade in another partial examination.

(3) [1]The overall grade is calculated by a weighted arithmetic average of the individual grades. [2]The weight of an individual grade is the same as the number of ECTS credits allocated to the subject for which the grade was awarded.

(4) [1]In addition to the overall examination grade in accordance with Para. 3, a relative grade based on the numerical value attained is shown according to the ECTS user guide in accordance with the regulations contained in § 8 Para. 6 of the general examination regulations of the Deggendorf Institute of Technology.

§ 8
Master thesis

(1) [1]A Master thesis has to be written to obtain a Master's degree.[2] It must demonstrate the student's ability to apply the knowledge acquired during studies on the basis of independent scientific work in engineering projects.

(2) The period from choosing a topic to submission must be appropriate to the scope of the topic and is six months.

(3) [1]The Master thesis may be written in German with the approval of the Examination Committee. [2]Ultimately, it must be presented within the university. The presentation is included in the evaluation of the Master thesis.

(4) Registration for the Master thesis requires that at least 30 ECTS credits have been obtained.

§ 9
Certificate

A certificate of the passed Master examination is issued in accordance with the respective sample in the annex to the general examination regulations of the Deggendorf Institute of Technology.

§ 10
Academic degree and diploma supplement

(1) Upon successful completion of the Master examination, the academic degree of "Master of Engineering", abbreviated "M.Eng.", is awarded.

(2) A certificate granting the academic degree is issued in accordance with the respective sample in the annex to the general examination regulations of the Deggendorf Institute of Technology.

(3) A diploma supplement, which describes in particular the essential course content underlying the degree, the course of studies and the qualification obtained with the degree, is enclosed with the certificate.

§ 11
Coming into effect

These study and examination regulations come into effect on 1st October 2018.

Annex 1
To the study and examination regulations for the Master programme of Mechatronic and Cyber-Physical Systems at the Deggendorf Institute of Technology

Overview of the modules and courses at DIT:

Master in Mechatronic and Cyber-Physical Systems										
Semester periods per week (SWS)										
Overview of module/course numbers, module and course descriptions, SWS and ECTS			Module	1st Sem	2nd Sem	3rd Sem	ECTS	Weighting for module grade	Form of teaching	Examination performances [1]
Module No.	Course no.	**Module**/Course								
MCS-1		**Cyber Physical Systems**	6				6			GMPschr 90 min.
	MCS1101	Structure and Functions of Cyber Physical Systems		4				4	SU/Ü	
	MCS1102	Business Models for CPS		2				2	SU/Ü	
MCS-2		**Cooperative and Autonomous Systems**	12				14			
	MCS1103	Advanced Robotics		4				4	SU	
	MCS1104	Autonomous Systems		4				4	SU	schP 120 min.
	MCS1105	Case Study Cooperative and Autonomous Systems		4				6	Ü	PStA
MCS-3		**Advanced Simulation Systems**	8				10			
	MCS1106	Advanced Modelling and Simulation		4				4	SU	schP 90 min.
	MCS1107	Case Study Mechatronic System Simula	tion	4				6	Ü	PStA
MCS-4		**Human Machine Interfaces**	10				12			
	MCS2101	Virtual Reality/Augmented Reality			4			4	SU	
	MCS2102	Mobile and Adaptive HMI			2			2	SU	schP 120 min.
	MCS2103	Case Study VR/AR in System Engineeri	ng		4			6	Ü	PStA
MCS-5		**Additive Manufacturing (AM)**	12				14			
	MCS2104	Technologies of Additive Manufacturi	ng		4			4	SU	
	MCS2015	AM Production Processes			4			4	SU	schP 150 min.
	MCS2106	Case Study Cyberphysical Production Systems using AM			4			6	Ü	PStA
MCS-6		**Subject-specific elective module (FWP)**	4				4			GMPschr 90 min.
	MCS2107	(See curriculum) E.g., Software Engineering, CPS in Logistic Systems, Change Management			4			4	SU/Ü	
MCS-7		**Functional Safety**	6				6			GMPschr 90 min.
	MCS3101	Principles of Functional Safety				4		4	SU/Ü	
	MCS3102	Design of Safe Systems				2		2	SU/Ü	
MCS-8		**Master Module**					24			
	MCS3103	Master thesis						22	MA	
	MCS3104	Master seminar						2	S	
		Total SWS		26	26	6	**58**			
		Total ECTS		30	30	30	**90**	**90**		

[1] Details are regulated by the curriculum

Abbreviations:

MA:	Master thesis
ECTS:	European Credit Transfer System
GMPschr:	Written examination for the complete module
PstA:	Examination research project
S:	Seminar
schrP:	Written examination
SU:	Seminar-based class
SWS:	Semester periods per week
Ü:	Tutorial