

**Study and Examination Regulations for  
the Master Programme of  
Mechatronic and Cyber-Physical Systems at  
the Deggendorf Institute of Technology  
Dated 15th March 2021**

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 (GVGl. P. 245; BayRS 2210-1-1-K), last amended by § 1 of the Act of 24 July 2020, (GVGl. p. 382), 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) <sup>1</sup>The programme deals with what is taught in a Bachelor or Diploma programme in greater depth. <sup>2</sup>The aim is to enable graduates to work creatively in research and development departments. <sup>3</sup>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) <sup>1</sup>Lectures are conducted in English. <sup>2</sup>Examination papers are drawn up in English.

### **§ 3 Qualification for the programme**

(1) <sup>1</sup>Qualification for gaining entry to 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 mechatronics or a related course of study, or a degree which is equivalent to such a university degree. <sup>2</sup>The Examination Committee decides on the equivalence of degrees.

and

- proof of eligibility for the course in question pursuant to § 5 of these by-laws

(2) Proof of the following language skills should be furnished for this programme:

- Knowledge of the English language at level B2 according to the Common European Framework of Reference for Languages.
- Knowledge of the German language at level A2 according to the Common European Framework of Reference for Languages.

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

### **§ 4 Proof of ECTS credits not yet obtained**

<sup>1</sup>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. <sup>2</sup>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. <sup>3</sup>The proof can be provided only once for each variant. <sup>4</sup>A maximum of 30 ECTS credits can be proven. <sup>5</sup>The following conditions apply for the proof:

1. Internship:  
Successful completion of a relevant internship in mechatronics or a related field lasting at least 20 weeks.
2. University courses:

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

## § 5

### Proof of course eligibility

- (1) <sup>1</sup>A student's eligibility for the degree programme is determined on the basis of a 90-minute written or online examination. <sup>2</sup>The date of the examination is set by the Examination Committee. <sup>3</sup>The examination involves complex tasks on relevant subjects relating to advanced mathematics for engineers as well as fundamental aspects concerning mechatronics, mechanical engineering as well as electronic engineering and their applications, as described in detail in the Module Handbook Bachelor of Mechatronics Majoring in Digital Production, for example. <sup>4</sup>The subject matter covered by the following modules are of relevance: MDP-02 Engineering Mathematics 1; MDP-03 Engineering Mathematics 2; MDP-04 Fundamentals of Physics; MDP-09 Basics of Informatics, MDP-10 Informatics 2, MDP-11 Basics of Electronic Engineering; as well as MDP-12 Basics of Control Engineering. <sup>5</sup>The examination is deemed to have been passed if the candidate achieves a "successfully passed" grade. <sup>6</sup>To ascertain a grade, the examination is evaluated by two university lecturers. <sup>7</sup>The two examiners jointly set the relevant marking system to be used in order to determine whether the candidate has been successful. <sup>8</sup>The approaches to solving the tasks must be logical and comprehensible. <sup>9</sup>Both university lecturers must reach a consensus when arriving at the examination result. <sup>10</sup>At least one of the two university lecturers must teach in one of the relevant degree programmes at Deggendorf Institute of Technology. <sup>11</sup>The university lecturers are appointed by the Faculty Council Applied Natural Sciences and Industrial Engineering and/or the Faculty Council Mechanical Engineering and Mechatronics.
- (2) <sup>1</sup>The Examination Committee may waive a candidate's obligation to take the course-specific eligibility exam if the applicant demonstrates above-average knowledge as verified through their degree awards pursuant to § 3 Para. Clause 1. <sup>2</sup>Above-average degree awards are deemed to be an overall grade of "good" (<2.5) or better, or demonstrate above-average knowledge (a grade of 2.5 or better) in Mathematics, Physics, Informatics, Electronic Engineering, and Control Engineering
- (3) The procedure for determining a candidate's eligibility for a specific degree programme is conducted once every six months during the winter semester for the following summer semester and once every six months during the summer semester for the following winter semester.
- (4) <sup>1</sup>Applicants who have not been able to demonstrate their eligibility for the degree programme may re-apply to take the examination the following

year. <sup>2</sup>In justified exceptional cases, a candidate may register for the examination at a later juncture. <sup>3</sup>The examination may only be repeated once.

- (5) <sup>1</sup>Applicants are notified in writing of their written examination result. <sup>2</sup>The reasons for the candidate not passing the examination must be provided.
- (6) No right or entitlement to the Master's degree programme being offered shall exist in the event of insufficient applicant numbers.

## **§ 6**

### **Modules and proof of performance**

- (1) <sup>1</sup>The programme comprises modules that can be composed of thematically-related courses. <sup>2</sup>Each module is assigned ECTS credits that take into account the time required by students to complete the module.
- (2) <sup>1</sup>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. <sup>2</sup>Regulations are supplemented by the curriculum for the subject-specific elective modules.
- (3) <sup>1</sup>All courses comprise compulsory modules, elective modules or optional modules:
  - 1. Compulsory modules are binding for all students.
  - 2. <sup>1</sup>Elective modules are offered as alternatives. <sup>2</sup>Students have to select certain modules from these in accordance with these study and examination regulations. <sup>3</sup>Selected modules are treated as compulsory modules.
  - 3. <sup>1</sup>Optional modules are modules that are not mandatory for achieving the study objective. <sup>2</sup>Students can additionally choose these from the courses offered by the university.
- (4) <sup>1</sup>There is no claim that the elective and optional modules will actually be offered. <sup>2</sup>Likewise, there is no claim that the accompanying courses will be held when the number of participants is insufficient.

## **§ 7**

### **Curriculum**

<sup>1</sup>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. <sup>2</sup>The curriculum is decided by the Faculty Council and must be announced within the university before the semester starts. <sup>3</sup>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.

## **§ 8**

### **Assessment of examination performance, overall examination grade**

- (1) <sup>1</sup>There is an examination for each module. <sup>2</sup>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. <sup>3</sup>Individual examination performances are weighted according to the allotted ECTScredits.
- (2) <sup>1</sup>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) <sup>1</sup>The overall grade is calculated by a weighted arithmetic average of the individual grades. <sup>2</sup>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) <sup>1</sup>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.

## **§ 9**

### **Master thesis**

- (1) <sup>1</sup>A Master thesis has to be written to obtain a Master's degree. <sup>2</sup>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) <sup>1</sup>The Master thesis may be written in German with the approval of the Examination Committee. <sup>2</sup>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.

## **§ 10 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.

## **§ 11 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.

## **§ 12 Coming into effect**

These study and examination regulations come into effect on 15th March 2021.

## 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 TH Cham:

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		ECTS	Weighting for module grade	Form of teaching	Examination performances <sup>1)</sup>
Module No.	Course no.	Module/Course								
<b>MCS-1</b>		<b>Cyber Physical Systems</b>	6				6			schrP 90 min
	MCS 1101	Structure and Functions of Cyber Physical Systems		4				4	SU/Ü	
	MCS 1102	Business Models for CPS		2				2	SU/Ü	
<b>MCS-2</b>		<b>Cooperative and autonomous systems</b>	8				8			schrP 120 min
	MCS 1103	Advanced Robotics		4				4	SU	
	MCS 1104	Autonomous systems		4				4	SU	
<b>MCS-03</b>		<b>Case Study Cooperative and autonomous systems</b>	4	4			6	6	Ü	PStA
<b>MCS-4</b>		<b>Advanced Simulation Systems</b>	4	4			4	4	SU	schrP 90 min
<b>MCS-5</b>		<b>Case Study Mechatronic System Simulation</b>	4	4			6	6	Ü	PStA
<b>MCS-6</b>		<b>Human Machine Interfaces</b>	6				6			schrP 120 min
	MCS 2101	Virtual Reality / Augmented Reality			4			4	SU	
	MCS 2102	Mobile and adaptive HMI			2			2	SU	
<b>MCS-7</b>		<b>Case Study VR/AR in System Engineering</b>	4		4		6	6	Ü	PStA
<b>MCS-8</b>		<b>Additive Manufacturing (AM)</b>	8				8			schrP 150 min
	MCS 2103	Technologies of Additive Manufacturing			4			4	SU	
	MCS 2014	AM production processes			4			4	SU	schrP 150 min
<b>MCS-9</b>		<b>Case Study Cyberphysical production systems using AM</b>	4		4		6	6	Ü	PStA
<b>MCS-10</b>		<b>Subject - related elective course (FWP)</b>	4				4			
	MCS 2105	(according to the study plan) e.g. Software Engineering, CPS in Logistic Systems, Change Management			4			4	SU/Ü	
<b>MCS-11</b>		<b>Functional Safety</b>	6				6			schrP 90 min
	MCS 3101	Principles of Functional Safety				4		4	SU/Ü	
	MCS 3102	Design of safe Systems				2		2	SU/Ü	
<b>MCS-12</b>		<b>Master Module</b>					24			
	MCS 3103	Master thesis						22	MA	
	MCS 3104	Master seminar						2	S	
		Total SWS		26	26	6	58			
		Total ECTS		30	30	30	90	90		
<sup>1)</sup> Details are regulated by the curriculum										
<b>Abbreviations:</b>										
	MA	Master thesis							schrP	Written examination
	ECTS	European Credit Transfer System							GMPschr	Written examination for the complete module
	LN	Course transcript							TMPschr	Written examination for partial module
	MA	Master thesis							SU	Seminar-based class
	mdP	Oral examination							SWS	Semester periods per week
	Pr	Internship							Ü	Tutorial
	PstA	Examination research project								
	S	Seminar								

Issued on the basis of the enactment passed by the Senate of Deggendorf Institute of Technology on 2 December 2020 and the supervisory approval of the Vice-President of Deggendorf Institute of Technology on 15 March 2021.

Signed  
Prof. Waldemar Berg  
Vice-President

The by-laws were recorded at Deggendorf Institute of Technology on 15 March 2021. The recorded by-laws were duly posted on the notice boards on 15 March 2021. Their day of announcement is therefore 15 March 2021.