

**Study and Examination Regulation**  
**for the Master Programme**  
**Artificial Intelligence for Smart Sensors and Actuators (M.Eng.)**  
**at the Deggendorf Institute of Technology**  
**as of 15 March 2021**

On the basis of Article 13, Paragraph 2, Sentence 2, 58, Paragraph 1, 61, Paragraph 2, Sentence 1 of the Bavarian Higher Education Act (BayHSchG) dated 23 May 2006 (GVBl. p. 245, Bay RS 2210-1-1-WK), as last amended by Section 1 of the Act dated 24 July 2020 (GVBl. p. 382), the Deggendorf Institute of Technology issues the following statutes:

**§ 1**

**Objective**

- (1) The Master's degree programme in Artificial Intelligence for Smart Sensors and Actuators is intended to enable graduates of a diploma or bachelor's degree programme to underpin the knowledge gained so far with theoretical knowledge in order to meet the requirements of modern research and development tasks in a special way.
- (2) <sup>1</sup>The degree programme supplements a Bachelor's or Diploma degree programme with in-depth and subject-specific content. <sup>2</sup>The graduates should thus be enabled to work creatively in research and development departments. <sup>3</sup>In addition, particularly qualified students are to receive the theoretical foundations that will enable them to do a doctorate or work in scientific fields.

**§ 2**

**Structure**

- (1) The programme comprises three theoretical semesters of study and concludes with the Master's thesis.
- (2) <sup>1</sup>The lectures are held in English. <sup>2</sup>The examinations are written in English.

### **§ 3**

#### **Qualification for the course**

(1) <sup>1</sup>Qualification requirements for admission to the Master's programme in Artificial Intelligence for Smart Sensors / Actuators are:

- the completion of an undergraduate degree at a domestic or foreign higher education institution with a minimum of 210 ECTS points from the field of mechatronics or a related degree programme or a degree that is equivalent to such a higher education degree. <sup>2</sup>The examination board shall decide on the equivalence of the degrees

and

- proof of suitability for the degree programme in accordance with §5 of these statutes.

(2) Proof of the following language skills is required for this degree programme:

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

With regard to the proof, the regulations in §3 of the framework general examination regulations for additional qualifications in foreign languages and compulsory elective subjects of a general academic nature (AWP) at Deggendorf Institute of Technology apply in the currently valid version.

### **§ 4**

#### **Proof of missing ECTS points**

<sup>1</sup>If applicants provide evidence of a university degree justifying admission for which less than 210 ECTS points but at least 180 ECTS points were awarded or were classified as equivalent, proof of the missing ECTS points is a prerequisite for passing the Master's examination. <sup>2</sup>Missing ECTS points, which must be earned by the beginning of the third semester, can be proven upon application to the examination board by completing an additional internship or by participating in relevant university courses. <sup>3</sup>The evidence can only be provided once for each variant. <sup>4</sup>A maximum of 30 ECTS points can be verified. <sup>5</sup>The following conditions apply for the verification:

1. internship: The successful completion of a relevant internship in the field of mechatronics or a related field of at least 20 weeks duration.

2. university courses: <sup>1</sup>The university courses must be taken from the relevant undergraduate courses offered by the university. <sup>2</sup>A prior consultation must be held with the responsible subject advisor, in the course of which an individual concept will be developed together with the applicant.

## **§ 5**

### **Proof of suitability for the specific for this course of study**

- (1) <sup>1</sup>Determination of the degree programme-specific aptitude takes place by means of a written or online-based examination lasting 90 minutes. <sup>2</sup>The date is set by the examination board. <sup>3</sup>The subject of the examination are complex tasks on relevant topics from higher mathematics for engineers, as well as on fundamentals from mechatronics, mechanical engineering and electrical engineering, as well as their applications, as described in detail, for example, in the Module Handbook Bachelor Mechatronics Focus Digital Production. <sup>4</sup>The modules MDP-02 Engineering Mathematics 1, MDP-03 Engineering Mathematics 2, MDP-04 Fundamentals of Physics, MDP-09 Fundamentals of Computer Science, MDP-10 Computer Science 2, MDP-11 Fundamentals of Electrical Engineering and MDP-12 Fundamentals of Control Engineering are relevant to the subject. <sup>5</sup>The examination is passed if the grade "successfully passed" has been achieved. <sup>6</sup>For this purpose, the examination shall be assessed by two university lecturers. <sup>7</sup>The two examiners determine the respective exam-specific point key which determines the success of the participation. <sup>8</sup>The solution approaches must be logically comprehensible. <sup>9</sup>Both university lecturers must agree in this assessment of results. <sup>10</sup>Of the two university lecturers, at least one must teach in a relevant degree programme at Deggendorf Institute of Technology. <sup>11</sup>The appointment of the university lecturers is made by the Faculty Council of Applied Natural Sciences and Industrial Engineering.
- (2) <sup>1</sup>The examination board may waive participation in the examination to determine the degree programme-specific aptitude if the study applicant demonstrates above-average knowledge in the degrees pursuant to §3 paragraph 1 no. 1. <sup>2</sup>Degrees with the grade "good" (<2.5) and better or above-average knowledge (grade 2.5 and better) in the subjects mathematics, physics, computer science, electrical engineering and control engineering shall be deemed to be above-average.
- (3) The procedure for determining the suitability for a specific degree programme will be conducted once every six months in the winter semester for the following summer semester.

- (4) <sup>1</sup>Applicants who have not provided proof of the degree programme-specific aptitude may re-register for the test once for the deadline of the following year. <sup>2</sup>In justified exceptional cases, registration at a later date is possible. <sup>3</sup>A further repetition is not possible.
- (5) <sup>1</sup>Applicants shall be notified in writing of the result of the written examination. <sup>2</sup>Reasons shall be given for a negative decision.
- (6) There is no entitlement to the Master's degree programme being offered if the number of applicants is insufficient.

## § 6

### Modules and examinations

- (1) <sup>1</sup>The degree programme consists of modules, which may be composed of subject-related courses. <sup>2</sup>Each module shall be assigned ECTS points which take into account the time required of the students.
- (2) <sup>1</sup>The compulsory and elective modules, their number of hours, the form of teaching, the examinations as well as the ECTS points are specified in the annex to these statutes. <sup>2</sup>The regulations are supplemented for the subject-specific elective modules by the curriculum.
- (3) <sup>1</sup>All courses consist of compulsory modules, compulsory elective modules or elective modules:
1. compulsory modules are compulsory for all students.
  2. <sup>1</sup>Compulsory elective modules are offered alternatively. <sup>2</sup>Students must make a specific selection from among them in accordance with these study and examination regulations. <sup>3</sup>The selected modules shall be treated as compulsory modules.
  3. <sup>1</sup>Elective modules are modules which are not compulsory for the achievement of the study objective. <sup>2</sup>They may be additionally selected by the students from the range of courses offered by the university.
- (4) <sup>1</sup>There is no entitlement to compulsory elective modules and elective modules actually being offered. <sup>2</sup> Similarly, there is no entitlement to the corresponding courses being held if there are not enough participants.

## **§ 7**

### **Curriculum**

<sup>1</sup>The responsible faculty draws up a study plan to ensure that the courses are offered and to provide information to the students, which shows the course of study in more detail. <sup>2</sup>The curriculum is decided by the Faculty Council and is to be announced to the university public before the beginning of the semester. <sup>3</sup>The announcement of amendments or new regulations must be made at the beginning of the lecture period of the semester in which these amendments are to be applied for the first time at the latest. <sup>4</sup>The curriculum contains in particular regulations and information on

1. the time allocation of the weekly semester hours per module and study semester incl. ECTS points,
2. the designation of the compulsory and elective modules as well as their semester hours per week, the form of teaching, the study objectives and the study contents of these modules,
3. the subject-specific compulsory elective modules with their number of hours,
4. the type of courses in the individual modules, insofar as they have not been conclusively determined in the Annex.

## **§ 8**

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

- (1) <sup>1</sup>An examination is assigned to each module. <sup>2</sup>If a module examination consists of several examinations, the module grade is calculated from the arithmetic mean of the grades of the individual examinations rounded down to one decimal place. <sup>3</sup>The individual examinations are weighted according to the ECTS points assigned.
- (2) If a module examination consists of several examinations, the grade "not sufficient" in one partial examination cannot be compensated by a better grade in another partial examination.
- (3) <sup>1</sup>The overall examination grade shall be calculated by taking the weighted arithmetic mean of the individual grades. <sup>2</sup>The weight of an individual mark shall be equal to the number of ECTS points allocated to the subject for which the grade was awarded.
- (4) In addition to the overall examination grade according to Para. 3, a relative grade is shown according to the ECTS User Guide in accordance with the regulations in §8 Para. 6 of the General Examination Regulations of the Deggendorf Institute of Technology on the basis of the numerical value achieved.

## **§ 9**

### **Master thesis**

- (1) <sup>1</sup>To obtain the Master's degree, a Master's thesis must be written. <sup>2</sup>In this thesis, the student shall demonstrate his or her ability to apply the

knowledge in an independent scientific work to projects from engineering practice.

- (2) The period from the topic to the submission must be appropriate to the scope of the topic and is six months.
- (3) <sup>1</sup>The Master's thesis may be written in German with the consent of the examination board. <sup>2</sup>The thesis shall be presented to the university public in the form of a lecture; the presentation is included in the assessment of the Master's thesis.
- (4) Registration for the Master's thesis requires that at least 30 ECTS points have been achieved.

## **§ 10**

### **Certificate**

A certificate is issued for the passed Master's examination in accordance with the respective model in the Annex to the General Examination Regulations of the Deggendorf Institute of Technology.

## **§ 11**

### **Academic Degree and Diploma Supplement**

- (1) On the basis of the successful completion of the Master's examination, the academic degree "Master of Engineering", abbreviated to: "M.Eng." shall be awarded.
- (2) A certificate shall be issued for the academic degree in accordance with the respective model in the Annex to the General Examination Regulations of the Deggendorf Institute of Technology.
- (3) A Diploma Supplement is attached to the certificate, which describes in more detail the essential content of the degree, the course of study and the qualification obtained with the degree.

## **§ 12**

### **Entry into force**

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

## Annex 1

### to the Study and Examination Regulations for the Master's Programme Artificial Intelligence for Smart Sensors / Actuators at the Deggendorf Institute of Technology

#### Overview of the modules, courses at the Deggendorf Institute of Technology:

Master Artificial Intelligence for Smart Sensors / Actuators										
Weekly hours per semester (SWS)										
Overview over the module/course no. and names, SWS and ECTS			Module	1st sem	2nd sem	3rd sem	ECTS	Weighting for the module grade	Type of lecture	Type of exam <sup>1)</sup>
Module No.	Course no.	Module/course								
<b>MSS-01</b>		<b>Intelligent Systems</b>	6				6			GMPschr 120 min
	MSS 1101	Introduction to Artificial Intelligence		2				2	SU/Ü	
	MSS 1102	Machine Learning and Deep Learning		4				4	SU/Ü	
<b>MSS-02</b>		<b>Smart Sensors and Actuators</b>	6				6			GMPschr 120 min
	MSS 1103	Microsystems and Physical Crosscoupling		4				4	SU	
	MSS 1104	Data Acquisition and Control		2				2	SU	
<b>MSS-03</b>		<b>Case Study Sensors and Actuators</b>	4				6			
	MSS 1105	Case Study Sensors and Actuators		4				6	Ü	PStA
<b>MSS-04</b>		<b>Embedded Control Solutions</b>	6				6			GMPschr 120 min
	MSS 1106	Microcontroller Architectures		2				2	SU	
	MSS 1107	Modell Based Function Engineering		4				4	SU	
<b>MSS-05</b>		<b>Case Study Embedded Control Solutions</b>	4				6			
	MSS 1108	Case Study Embedded Control Solutions		4				6	Ü	PStA
<b>MSS-06</b>		<b>Advanced Intelligent Systems</b>	6				6			GMPschr 120 min
	MSS 2101	Big Data			4			4	SU	
	MSS 2102	Computer Vision			2			2	SU	
<b>MSS-07</b>		<b>Case Study Intelligent Systems</b>	4				6			
	MSS 2103	Case Study Intelligent Systems			4			6	Ü	PStA
<b>MSS-08</b>		<b>Autonomous systems</b>	8				8			GMPschr 150 min
	MSS 2104	Algorithms of Autonomous Systems			4			4		
	MSS 2105	Autonomous Robotics			4			4		
<b>MSS-09</b>	MSS 2106	<b>Case Study Autonomous Systems</b>	4				6			
	MSS 2106	Case Study Autonomous Systems			4			6		PStA
<b>MSS-10</b>		<b>Subject-specific elective (FWP) module</b>	4				4			<sup>2)</sup>
	MSS 2107	from subject catalogue			4			4	SU/Ü	
<b>MSS-11</b>		<b>Systems Design</b>	6				6			GMPschr 120 min
	MSS 3101	Systems Design				2		2	SU/Ü	
	MSS 3102	Systems Intercommunication				4		4	SU/Ü	
<b>MSS-12</b>		<b>Master module</b>					24			
	MSS 3103	Master thesis						22	MA	
	MSS 3104	Master seminar						2	S	
		SWS overall		26	26	6	<b>58</b>			
		ECTS overall		0	0	0	<b>90</b>	<b>90</b>		
<sup>1)</sup> Details are regulated by the curriculum										
<sup>2)</sup> The type of examination conducted for FWP courses is subject to the currently valid study regulations.										
<b>Abbreviations:</b>										
	MA	Master thesis				schP			written exam	
	ECTS	European Credit Transfer System				GMPschr			Overall written module examination	
	LN	Course-related proof of achievement				TMPschr			Partial module examination in writing	
	mdP	Oral exam				SU			Seminar	
	Pr	Internship				SWS			weekly hours per semester	
	PstA	Examination paper: Approx. 15-20 DIN A 4 pages; max. 12 weeks to complete.				Ü			Tutorial	
	S	Seminar								

Issued on the basis of the resolution of the Senate of the Deggendorf Institute of Technology dated 26 August 2020, the notification to the Bavarian State Ministry of Science and Art and the legal supervisory approval of the Vice President of the Deggendorf Institute of Technology dated 15 March 2021.

signed.  
Prof. Waldemar Berg  
Vice President

The statutes were deposited at the Deggendorf Institute of Technology on 15 March 2021. The laying down was announced by notice on 15 March 2021. The date of the announcement is therefore 15 March 2021.