

**Examination Regulations  
for the Master Course “Embedded Systems for Mechatronics”  
of the Faculty for Information Technology and Electrical Engineering  
of the University of Applied Sciences and Arts Dortmund (Fachhochschule Dortmund)**

**As of 17th July, 2014**

**Last amended by regulations dated 23th June 2015**

Whilst every effort has been made to ensure the above information is an accurate translation of the Examination Regulations for the Master Course “Embedded Systems for Mechatronics” of the Faculty for Information Technology and Electrical Engineering of the University of Applied Sciences and Arts Dortmund (Fachhochschule Dortmund) - Official Notes – Public Announcement, Volume 34, no. 78, 23.08.2013, last amended by regulations dated 23th June 2015 (Fachhochschule Dortmund) - Official Notes – Public Announcement, Volume 36, no. 55, 26.06.2015, the Fachhochschule Dortmund accepts no legal liability for its contents and reserves the right to make alterations and amendments if and when required.

**Programme Examination Regulations  
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of the Faculty for Information Technology and Electrical Engineering  
of the University of Applied Sciences and Arts Dortmund (Fachhochschule Dortmund)**

**As of 17th July, 2014**

In accordance with § 2 subsection 4 clause 1 and § 22 subsection 1 no. 3 of the „Gesetz über die Hochschulen des Landes Nordrhein-Westfalen“ (North-Rhine Westphalian University Act, abbreviated: HG) of 31<sup>st</sup> October 2006 (Law and Ordinance Gazette NRW. p. 474), last amended by article 6 of the Act dated 28th May 2013 (Law and Ordinance Gazette NRW. p.272), the University of Applied Sciences and Arts Dortmund (Fachhochschule Dortmund), has issued the following Programme Examination Regulations:

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## I. Preamble

Studies in the Master Course Programme “Embedded Systems for Mechatronics” lead to a both scientifically and professionally qualifying degree. They prepare for both a technical career and for senior management activities in technical projects. A subsequent academic career should optionally also be possible. The studies are supposed to prepare students with the required technical knowledge, skills and methods. In order to meet the requirements and changes in the professional world, the contents of the individual modules are taught in an application-oriented manner based on academic findings. Students are thus enabled to analyse processes and problems met in practice and to work out professional solutions while observing relations beyond their subject. Additionally, students are supposed to be enabled to participate in the academic debate within their area of expertise. Apart from acquiring technical and methodical competence, students are able to develop their personal and social skills. Students acquire professional skills and are able to act responsibly. International competences are promoted by studies abroad, in particular at the partner universities during the optional third semester abroad.

The language of instruction is English.

The Master Course Programme “Embedded Systems for Mechatronics” was developed and organised by the Faculties for Information Technology and Electrical Engineering, and Computer Science. The Faculty for Information Technology and Electrical Engineering has the responsibility for the organisation and delivery of the course programme.

Gender equality is observed in the design and structure of the course programme and its contents.

## II. General Regulations

### § 1

#### **Scope of application of the Course Programme Examination Regulations, General Examination Regulations**

- (1) These Programme Examination Regulations (PER) shall apply to the Master Course Programme “Embedded Systems for Mechatronics” of the Faculty for Information Technology and Electrical Engineering of the University of Applied Sciences and Arts Dortmund (Fachhochschule Dortmund). They shall govern the Master’s Examination in these course programmes according to § 64 sub 2 of the North-Rhine Westphalian University Act (HG NRW) in conjunction with the General Examination Regulations of the University of Applied Sciences and Arts Dortmund (Fachhochschule Dortmund) of 19<sup>th</sup> July 2013 (Official Notes – Official Journal – of the University of Applied Sciences and Arts Dortmund (Fachhochschule Dortmund), volume 34, no. 64 of 22-Jul-2013) in their relevant applicable version.
- (2) These PER specify the General Examination Regulations – hereafter referred to as GER – for the Master Course Programme “Embedded Systems for Mechatronics”. They specify complementary as well as alternative regulations which do not contradict the General Examination Regulations.

## § 2

### **Objective of the course programme, bachelor's and master's degree**

[with reference to § 2 RahmenPO]

- (1) The course of studies leading to the Master's Examination, duly heeding the general aims of the course of study (§ 58 HG), includes in particular the application-related contents of the curriculum on the basis of academic findings, and is designed to enable students to independently analyse problems using scientific methods and to attend to these according to engineering methods while observing aspects relevant for society. The course of studies is designed to develop the inventive and creative skills of the students and to prepare them for the Master's Examination.
- (2) Students complete their course of studies with the Master's Examination. The Master's Examination serves to determine whether the students have acquired the advanced professional expertise as well as methodological and key skills required for independently working in their profession and whether they are capable to independently work entrepreneurially based on academic findings and methods.
- (3) If the Master's Examination has been passed, the University of Applied Sciences and Arts, Fachhochschule Dortmund, awards the degree "Master of Engineering" ("M.Eng.").
- (4) For the rest, § 2 of the General Examination Regulations shall apply.

## § 3

### **Modular structure and credit point system**

[with reference to § 3 RahmenPO]

- (1) The workload for the course of studies amounts to a total of 3,600 hours (900 hours/semester), including the time for working on the Master's Thesis. A total of 48 credit hours (1 credit hour = 45 mins.) are allotted to the classroom sessions with compulsory attendance. Based on these Examination Regulations the course of studies is organised in a way which allows its completion within the normal course duration.
- (2) To successfully complete the course of studies, a total of 120 credit points according to the European Credit Transfer and Accumulation System (ECTS) have to be obtained.
- (3) The modules of the Master Course Programme "Embedded Systems for Mechatronics" including its number of working hours and their distribution to the semesters are stated in detail in **attachments 1 and 2**. The descriptions of the modules and classes can be found in the applicable version of the module handbook of the Master Course Programme "Embedded Systems for Mechatronics".
- (4) For the rest, § 3 of the General Examination Regulations shall apply.

## § 4

### **Entry requirements**

[with reference to § 4 RahmenPO]

- (1) Requirements for commencing the course of studies are
  - 1a. the completion of a Diplom or Bachelor course of studies of Information Technology, Electrical Engineering or (Technical) Computer Science at a university of applied sciences (Fachhochschule) or a university or the completion of a corresponding accredited bachelor training programme at a university of cooperative education (Berufsakademie) with an overall grade of at least "good" (2.3), or

1b. the completion of a Diplom or Bachelor course of studies in a related field other than those stated under 1a. at a university of applied sciences (Fachhochschule) or a university or the completion of a corresponding accredited bachelor training programme at a university of cooperative education (Berufsakademie) with an overall grade of at least “good” (2.3). Related courses shall be those whose curriculum includes credit points and examinations in the field of study of Information Technology, Electrical Engineering, as well as Computer Science amounting to a total minimum of 70% of the overall volume and which includes sufficient course contents related to the development of embedded systems;

and the evidence of sufficient English skills provided by a TOEFL-ITP test with at least 550 points or a TOEFL-iBT test with at least 90 points passed within the two years before the application was submitted. The evidence may also be provided by other test methods equivalent to the TOEFL test (e.g. IELTS with at least 6.5 points) or by equivalent credit points and examination results. Sufficient English skills shall be deemed proven by the completion of a course programme in English. Course programmes according to nos. 1a and 1b at foreign universities shall also have to include a final thesis comparable to the course programmes at German universities with regard to the qualitative minimum requirements.

- (2) For the definition of related courses of studies and their documentation in a corresponding list (subsection 1 no. 1b) the Faculties for Information Technology and Electrical Engineering, and Computer Science form a joint expert committee. If there is doubt regarding the comparability of the final thesis within the meaning of sub. 1 no. 2 the expert committee shall decide. It can request further documents for a review.
- (3) The expert committee consists of four members, who are elected by the faculty councils of the Faculties for Information Technology and Electrical Engineering, and Computer Science from the respective circle of professors involved in the Master Course Programme “Embedded Systems for Mechatronics” at the University of Applied Sciences and Arts, Fachhochschule Dortmund. Two members each should be members of the Faculty for Information Technology and Electrical Engineering, and the Faculty for Computer Science.
- (4) The expert committee shall discuss and decide in closed meetings. It shall have a quorum if at least three members are present.
- (5) For the rest, § 4 of the General Examination Regulations shall apply.

## **§ 5**

### **Student Advisory Services**

§ 5 of the General Examination Regulations shall apply.

## **§ 6**

### **Startof Study, normal course duration**

[with reference to § 1 subsection 2 clause 2 no. 2 RahmenPO]

- (1) Students start the Master Course „Embedded Systems for Mechatronics“ in the winter semester.
- (2) The normal course duration, including all examinations, is four semesters.

**§ 7****Examination board**

[with reference to § 6 RahmenPO]

- (1) The examination board for the Master Course „Embedded Systems for Mechatronics“ of the Faculty for Information Technology and Electrical Engineering is responsible for the organisation of the examinations and any further tasks assigned by these Examination Regulations or by the General Examination Regulations.

The examination board comprises

1. A professor acting as the chairperson;
  2. A professor acting as his / her deputy;
  3. Two other persons from the circle of professors;
  4. A member of the group of academic staff (§ 11 sub. 1 No. 2 HG);
  5. two students.
- (2) The members of the examination board are elected by the Faculty Council of the Faculty for Information and Electrical Engineering from among the members of the Faculty of Information Technology and Electrical Engineering and the Faculty for Computer Science of the University of Applied Sciences and Arts (Fachhochschule Dortmund).
- (3) For the rest, § 6 of the General Examination Regulations shall apply.

**§ 8****Examiners, observers**

§ 7 of the General Examination Regulations shall apply.

**§ 9****Transfer of credits and recognition of examination results**

§ 8 of the General Examination Regulations shall apply.

**§ 10****Assessment of examinations**

§ 9 of the General Examination Regulations shall apply.

**§ 11****Retaking examinations, compensation**

[with reference to § 10 RahmenPO]

- (1) If a module examination in the compulsory elective modules is finally graded “inadequate”, this may be compensated by passing another module examination from the catalogue of compulsory elective modules. This compensation is only possible once.
- (2) For the rest, § 10 of the General Examination Regulations shall apply.

**§ 12****Absence, withdrawal, fraudulent behaviour, breach of regulations**

§ 11 of the General Examination Regulations shall apply.

**§ 13**  
**Invalidity of examinations**

§ 12 of the General Examination Regulations shall apply.

**§ 14**  
**Access to examination papers**

§ 13 of the General Examination Regulations shall apply.

**§ 15**  
**Appeal proceedings**

§ 14 of the General Examination Regulations shall apply.

**§ 16**  
**Retention periods for examination documents**

§ 15 of the General Examination Regulations shall apply.

**III. Mentoring, discussion of students' current status of studies,  
modules requiring intensive support**

Section II General Examination Regulations (§§ 16 and 17) shall not apply.

**IV. Particular programme contents**

**§ 17**  
**Key qualifications**

[with reference to § 2 RahmenPO]

- (1) Part of the curricula according to **attachments 1 and 2** are modules, which completely or partly deal with the development of key qualifications. Details are contained in the module descriptions and handbooks.
- (2) For the rest, § 18 of the General Examination Regulations shall apply.

**§ 18**  
**Semesters abroad, work placement in Germany and abroad, practical semesters**

§ 19 of the General Examination Regulations shall not apply.

**V. Examination elements of the module examinations**

**§ 19**  
**Objective and form**

[with reference to § 20 RahmenPO]

- (1) Module Examinations take place in the modules laid down in **attachments 1 and 2**.
- (2) Admissible forms of examination are written examinations (§ 23) lasting no more than four clock hours, oral examinations (§ 25) lasting no more than 45 minutes per candidate, project-related work with documentation and presentation with an oral

examination lasting approximately 20 minutes. (§ 24). The project related work must be submitted at the oral examination.

- (3) For the rest, § 20 of the General Examination Regulations shall apply.

**§ 20****Admission to the module examinations**

[with reference to § 21 RahmenPO]

- (1) Admission to a module examination is only possible for anyone who
  1. is enrolled in the Master Course Programme “Embedded Systems for Mechatronics” at the University of Applied Sciences and Arts Dortmund (Fachhochschule Dortmund) or who is admitted as a cross-registered student and who is not on leave. Regarding students on leave § 1 sub. 1 clause 1 no. 1 GER shall apply;
  2. has made fewer than three valid attempts at an examination in the same or a comparable module or partial module in a Master Course Programme “Embedded Systems for Mechatronics”, or in a course programme closely related to the Master Course Programme “Embedded Systems for Mechatronics”.
- (2) Admission shall have to be denied if
  - a) the prerequisites stated in subsection 1 are not met or
  - b) the candidate has failed the same or a comparable examination in Germany in the Master Course Programme “Embedded Systems for Mechatronics” or in a course programme closely related to the Master Course Programme “Embedded Systems for Mechatronics” or has finally failed the Master’s Examination in a Master Course Programme “Embedded Systems”.
- (3) Via the “Online Services for Students – Registration for Examinations and Withdrawals”, the student can withdraw from module or partial module examinations until one week before the examination date at the latest without this examination then counting towards the possible attempts at the examination.

**§ 21****Conduct of Examinations**

§ 22 of the General Examination Regulations shall apply.

**§ 22****Written examinations**

§ 23 of the General Examination Regulations shall apply.

**§ 23****Project-related work**

§ 24 of the General Examination Regulations shall apply.

**§ 24****Oral examinations**

§ 25 of the General Examination Regulations shall apply.

**§ 25****Assignment papers and seminar presentations**

§ 26 of the General Examination Regulations shall apply.

**§ 26****Bonus points for work during the course of a semester**

§ 27 of the General Examination Regulations shall apply.

**VI. Thesis and Colloquy****§ 27****Thesis**

[with reference to § 28 RahmenPO]

- (1) The thesis is a written work of scholarship in the field of Embedded Systems. It should document that the candidate is independently capable of applying scientific and practical techniques to the processing of challenging tasks taken from his subject area, including not only specific individual technical details but also the wider implications.
- (2) The application for thesis should usually take place before the end of the third semester.
- (3) For the rest, § 28 of the General Examination Regulations shall apply.

**§ 28****Admission to the Thesis**

[with reference to § 29 RahmenPO]

- (1) Candidates are admitted to the thesis provided they
  1. meet the requirements of the module examinations according to § 17 sub. 1;
  2. have passed all module examinations according to **attachment 1** but for one compulsory module or one compulsory elective module respectively.
- (2) The application shall have to include the following documents unless they have already been provided:
  1. the documents proving the admission requirements according to subsection 1;
  2. a declaration whether the candidate has not or definitely not passed a final thesis or the master examination in a master course programme “Embedded Systems for Mechatronics” before.

A statement should be included indicating which examiner is willing to supervise the final thesis. If the candidate does not suggest a topic, the chairperson of the examination board shall ensure that the candidate is given a topic.

- (3) Admission shall have to be denied if
  - a) the requirements according to subsection 1 are not met, or
  - b) the documents according to subsection 2 are incomplete, or
  - c) in a master course programme “Embedded Systems for Mechatronics” in Germany a corresponding final thesis of the candidate, taking into account the possibility to retake the examination, has been graded “inadequate” (5.0) or the candidate has definitely not passed the master examination.
- (4) For the rest, § 29 of the General Examination Regulations shall apply.

**§ 29****Assignment and work on the Thesis**

[with reference to § 30 RahmenPO]

- (1) The time allocated to the writing of the thesis is a single, full time period of five months.
- (2) For the rest, § 30 of the General Examination Regulations shall apply.

**§ 30****Submission of the Thesis**

[with reference to § 31 RahmenPO]

- (1) Three copies of the final thesis shall have to be submitted to the examination committee within the time limit. The full texts of the online sources used in the thesis as well as the text of the thesis itself shall have to be submitted stored on a usual storage device together with the printed version of the thesis. The electronic transfer is inadmissible for the submission of the thesis within the time limit.
- (2) In order to further the students' competence to reflect on their work, an abstract of the key contents and results of the thesis shall have to be provided. If possible, the abstract should not exceed one DIN A4 page and present the approach and the result in a short form. It shall have to be submitted in English, together with the thesis.
- (3) For the rest, § 31 of the General Examination Regulations shall apply.

**§ 31****Colloquy**

[with reference to § 32 RahmenPO]

- (1) The colloquy supplements the thesis and both are assessed as a single examination.
- (2) The colloquy lasts approximately 60 minutes and consists of a presentation and a subsequent oral examination of 30 minutes.

**§ 32****Assessment of the thesis and the colloquy**

[with reference to § 33 RahmenPO]

- (1) The thesis and the colloquy are associated examinations and shall have to be assigned an overall grade by two examiners. The proportionate weighting is 80 % for the thesis and 20 % for the colloquy. One of the examiners shall have to be a professor of the Faculty for Information Technology and Electrical Engineering, or the Faculty for Computer Science at the University of Applied Sciences and Arts, Fachhochschule Dortmund.
- (2) For the rest, § 33 of the General Examination Regulations shall apply.

## VII. Master examination, certificates, records

### § 33

#### Result of the master examination

[with reference to § 34 RahmenPO]

- (1) A candidate has passed the master's examination when all prescribed module examinations and the thesis including the colloquy have been awarded a grade equal or better than "pass" (4.0).
- (2) For the rest, § 34 of the General Examination Regulations shall apply.

### § 34

#### Certificate, records, overall grade, diploma supplement, transcript of records

[with reference to § 35 RahmenPO]

- (1) Candidates that pass the master's examination, receive the results as a certificate, usually within four weeks of the last examination. The certificate contains information about the course, names of the modules, and module grades, the topic of the thesis and the combined grades of the thesis and oral defence, and the final grade.
- (2) The final grade for the master's examination is calculated from the weighted arithmetic mean of the individual grades of the module examinations and the thesis including colloquy according to § 9 General Examination Regulations. The following weighting of the grades is applied:

Thesis and Colloquy .....	25 %
Arithmetic mean of the grades achieved in the module examinations ....	75 %

- (3) For the rest, § 3 of the General Examination Regulations shall apply.

### § 35

#### Additional modules

§ 27 of the General Examination Regulations shall apply.

### § 36

#### Master's Certificate

[with reference to § 37 RahmenPO]

- (1) Candidates that have passed the master's examination receive a Master's Degree Certificate. This certifies that the Master's degree (Master of Engineering, abbreviated M.Eng.) has been awarded according to § 2 sub. 2.
- (2) For the rest, § 37 of the General Examination Regulations shall apply.

**VIII. Final provisions****§ 37****Entry into force and publication**

- (1) These Examination Regulations enter into force on 1 September 2014.
- (2) These examination regulations will be published in the Official Notes – Official Journal -- of the University of Applied Sciences and Arts, Fachhochschule Dortmund.

Issued based on the resolutions of the Faculty Council of the Faculty for Information Technology and Electrical Engineering of 25.06.2014 as well as the Rektorate of the University of Applied Sciences and Arts Dortmund (Fachhochschule Dortmund) of 15.07.2014.

Dortmund, 17th July 2014

The Rector of the University of Applied  
Sciences and Arts Dortmund  
(Fachhochschule Dortmund)

Prof. Dr. Schwick

The Dean of the Faculty for Information  
Technology and Electrical Engineering of the  
University of Applied Sciences and Arts  
Dortmund (Fachhochschule Dortmund)

Prof. Dr. Wißing

**Modules, module examinations and periods; student workload; credit points according to the European Credit Transfer and Accumulation System (ECTS)** **Attachment 1**

1. Semester (Wintersemester)					
Module	module examination	student workload			ECTS points
		contact hours		self-study (hrs)	
		weekly hrs per semester	hrs		
Control Theory and Systems	ME 1	4	60	120	6
Distributed and Parallel Systems	ME 2	4	60	120	6
Embedded Software Engineering	ME 3	4	60	120	6
Introduction to Embedded Systems Design	ME 4	4	60	120	6
Signal Processing	ME 5	4	60	120	6
<b>total</b>	<b>5</b>	<b>20</b>	<b>300</b>	<b>600</b>	<b>30</b>

2. Semester (Sommersemester)					
Module	module examination	student workload			ECTS points
		contact hours		self-study (hrs)	
		weekly hrs per semester	hrs		
Mechatronic Systems Engineering	ME 6	4	60	120	6
Microelectronics & HW/SW Co-Design	ME 7	4	60	120	6
R&D Project Management	ME 8	4	60	120	6
Requirements Engineering	ME 9	4	60	120	6
Elective 1 *	ME 10	4	60	120	6
<b>total</b>	<b>5</b>	<b>20</b>	<b>300</b>	<b>600</b>	<b>30</b>

3. Semester (Wintersemester)					
Module	module examination	student workload			ECTS points
		contact hours		self-study (hrs)	
		weekly hrs per semester	hrs		
New Trends in Research	ME 11	4	60	120	6
Elective 2 *	ME 12	4	60	120	6
Research Project (Thesis)	ME 13	0	0	540	18
<b>total</b>	<b>3</b>	<b>8</b>	<b>120</b>	<b>780</b>	<b>30</b>

4. Semester (Sommersemester)					
Module	examination	student workload			ECTS points
		contact hours		self-study (hrs)	
		weekly hrs per semester	hrs		
Master Thesis and Colloquium	E	0	0	900	30
<b>total</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>900</b>	<b>30</b>

\* cf Attachment 2

## Catalogue of Electives (Elective 1 and 2)\*

## Attachment 2

2nd/3rd Semester				
Module	student workload			ECTS points
	contact hours		self-study (hrs)	
	weekly hrs per semester	hrs		
Applied Embedded Systems	4	60	120	6
Biomedical Systems	4	60	120	6
Computer Vision	4	60	120	6
SW Architectures for Embedded and Mechatronic Systems	4	60	120	6
Automotive Systems	4	60	120	6
Formal Methods in Mechatronics	4	60	120	6
Model Based and Model Driven Design	4	60	120	6
SoC Design	4	60	120	6

\* 2 modules from the catalogue of electives must be completed successfully (MP 10 and MP 12 according to Attachment 1)