Exam regulations

for the multidisciplinary master's degree course “mechatronics”

at the University of Siegen

(based on the German draft version dated 27th May 2013)

(includes changes pursuant to the inspection and opinion of the reaccreditation commission of June and August 2012)

The translations provide a service to international students, researchers and staff.
The legally binding versions of the notifications are available in German only.

Due to section 2 (4) and section 94 (1) of the Act on Higher Education Institutions of the State of North Rhine-Westphalia (*Hochschulgesetz* – HG) of 14 March 2000 (Law and Ordinance Gazette p. 190), as last amended by the law of 21 March 2006 (Law and Ordinance Gazette NRW p. 119), the University of Siegen has issued the following exam regulations:

Contents

I. Scope and structure of these exam regulations

§ 1 Scope of these exam regulations

These exam regulations will be applied to students who have enrolled in the multidisciplinary mechatronics master's degree course for the first time in or after the winter semester 2012/13.

§ 2 Structure of these exam regulations

(1) In the context of these exam regulations, all the provisions of the "Uniform Rules for exams in the degree courses of the Department of Electrical Engineering and Computer Science at the University of Siegen" dated 25 February 2013, (hereinafter the "Uniform Rules") apply, provided that they are not excluded, replaced or modified by differing provisions in section IV of these examination regulations.

(2) These exam regulations are divided into:

- provisions which supplement the Uniform Rules (sections II and III),
- provisions which differ from the Uniform Rules (section IV),
- transitional and concluding provisions (section V),
- appendices with study credits and grade scales.

II. Objectives and completion of the master's degree course in mechatronics

§ 3 Objective of the degree and purpose of the exam

(1) Mechatronics is multidisciplinary degree course which accommodates the particular requirements of developing integrated systems by combining the disciplines of electrical engineering, mechanical engineering and computer science. The master's degree course in mechatronics follows on from a successfully completed degree which qualifies the holder for a profession. It is intended to give students the necessary technical knowledge, skills and methods to give them the capability to engage in interdisciplinary scientific work, critically assess scientific findings and act responsibly.

(2) The master's degree course in mechatronics will be conducted in English and facilitates access for applicants who hold a first degree (qualifying the holder for a profession) in an engineering discipline.

(3) The master's exam is intended to determine whether the candidate has acquired the in-depth subject knowledge necessary for practising his or her profession, has an overview of the interrelationships of his or her subject and has the ability to make use of scientific methods and findings.

(4) The modules belonging to the master's exam comprise courses in English, particularly from the "Mechanical Engineering" and "Electrical Engineering and Computer Science" departments. There will be no subdivision of the master's degree course into fields of study,

however there is the possibility within the “customisation” module block of selecting application modules from the module catalogue provided as per the table in Appendix 1.

§ 4 Degree

If the master's exam is passed, the University of Siegen awards the degree “Master of Science” or “M.Sc.” for short.

III. Structure and study credits of the master's degree course in mechatronics

§ 5 Standard period of study and required work

(1) The standard period of study is four semesters including the thesis (master thesis) and the master's exam. All study credits are to be earned during the degree so that the degree can be completed within the standard period of study.

(2) The required work comprises the following module blocks in accordance with Appendix 1, from which mandatory and elective modules amounting to a total of 90 credits[1] must be taken

- “customisation” module block,
- “integration” module block,
- “advanced” module block,
- “application” module block.

All the credits pertaining to the required work are listed in the table of study credits in Appendix 1. The total amount of exam and study credits required for successful completion of the degree including the bachelor-level thesis and the master thesis is 120 credit points, i.e. an average of 30 credit points per semester. The master thesis must be completed within six months.

(3) The master's exam comprises

- earning study credits in the modules as per the table in Appendix 1,
- producing a bachelor-level thesis in accordance with section 11 and a master thesis in accordance with Section 12.

IV. Provisions differing from the Uniform Rules

§ 6 General provisions

(1) The following paragraphs contain provisions which supplement, modify or replace the provisions of the Uniform Rules. In other respects, the Uniform Rules shall apply unchanged. The following paragraphs in this section have the same heading as the corresponding paragraphs in the Uniform Rules.

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[1] *Credit points = ECTS credit points = European Credit Transfer System*

§ 7 Mechatronics subcommittee of the central board of examiners

(1) The mechatronics subcommittee of the central board of examiners of the Faculty of Science and Technology is responsible for the mechatronics degree course. The subcommittee consists of the chairman, his or her deputy and six other members. Upon nomination by the respective group, the faculty council will elect the chairman, the deputy chairman and two other members from the group comprising the professors, two members from the group comprising the academic staff and two members from the group comprising the students.

(2) Only one member from the group comprising the academic staff shall have the right to vote. The faculty council shall decide which member has the right to vote when electing the academic staff to the mechatronics subcommittee of the central board of examiners. If the member with voting rights cannot participate in a vote, the voting rights pass to the other member from the group comprising the academic staff.

(3) The mechatronics subcommittee of the central board of examiners is composed equally of members of the two departments “Mechanical Engineering” and “Electrical Engineering and Computer Science”. Representatives for the members of the subcommittee are elected accordingly with the exception of the chairman and his or her deputy.

§ 8 Entry requirements

(1) For the master's degree course in mechatronics individuals can be admitted who

- hold a first degree which qualifies the holder for a profession, was acquired in an engineering discipline (Bachelor of Science, Bachelor of Engineering, Diplom-Ingenieur (FH)/Diplom-Ingenieurin (FH), Diplom-Ingenieur (Berufsakademie)/Diplom-Ingenieurin (Berufsakademie) or Diplom-Ingenieur (Uni)/Diplom-Ingenieurin (Uni)) and is attested by a certificate written in German or supplemented by an officially verified German translation, and
- has English language skills at the B2 level of the “Common European Framework of Reference for Languages”.

(2) An applicant with first degree (which qualifies the holder for a profession) which was obtained “with distinction” in the natural sciences, computer science or mathematics may also be approved on a case-by-case basis notwithstanding paragraph (1). .

(3) The chairman of the mechatronics subcommittee of the central board of examiners shall rule on the admission.

§ 9 Calculation of the master's exam's overall grade

The overall grade of the passed master's exam will be as follows:

for an average of up to 1.3 *and* with a grade for the master's thesis of 1.0	"with distinction"
for an average of up to 1.5	"very good"
for an average of 1.6 to 2.5	"good"
for an average of 2.6 to 3.5	"satisfactory"
for an average of 3.6 to 4.0	"adequate"

Types of study credits and their assessment

§ 10 Scientific project work

(1) In order to make the degree flexible, students who have sufficient subject knowledge in a module in the "customisation" module block may complete a scientific project worth 5 credit points instead of said module.

(2) The student must prove that he or she has sufficient subject knowledge in an oral or written exam. If this exam is passed successfully, the topic for a project to be completed instead of taking the module will be suggested.

§ 11 Bachelor-level thesis

(1) The bachelor-level thesis is to be completed in English during the third or fourth semester.

(2) The bachelor-level thesis is a graded study credit.

§ 12 Master thesis (final thesis)

(1) The master thesis is the thesis (*Abschlussarbeit*) for the mechatronics degree course within the meaning of the Uniform Rules.

(2) The master thesis can be set by any professor in the Department of Mechanical Engineering or the Department of Electrical Engineering and Computer Science or any academic staff member in either of the two aforementioned departments who has earned habilitation. It is to be completed in English.

(3) The master thesis must be completed within six months.

(4) The master thesis can only be set after 80 ECTS credit points have been achieved. The mechatronics subcommittee of the central board of examiners shall rule on exceptions on request.

(5) An integral part of the Master's thesis is a colloquium in English, in which the candidates give a presentation about the task, key stages of the work and the findings of the master thesis. The presentation will be followed by a discussion on the master thesis. The

colloquium is to last at least 30 minutes, but no more than 60 minutes . The examiner will set the date for the colloquium and invite the participant(s).

§ 13 Oral exam in supplement to written exams (resits of subject exams)

(1) After the failed written first exam attempt or after the failed written resit, the candidate has the option of taking a supplementary oral exam in each subject; this supplementary oral exam generally lasts at least 20, but no more than 40 minutes and the rules for oral exams also apply to it. The mechatronics subcommittee of the central board of examiners will set the exam date; it will usually be within four weeks of the announcement of the result of the written exam. The written exam can only be given the subject grade “adequate” (4.0) in the event of the supplementary oral exam being passed.

(2) An appeal against the grade is only permitted within a period of one month of the announcement of the exam results; the appeal is to be made in writing to the chairman of the mechatronics subcommittee of the central board of examiners.

§ 14 Calculation of the grade for modules which consist of two sub-modules

(1) The study credits of the mechatronics master's degree course include some modules which consist of two sub-modules. Due to the specific content and learning outcomes of the sub-modules, two sub-module exams which have been adapted accordingly will be set.

(2) The overall grade for a module consisting of two sub-modules is calculated from the arithmetic mean of the grades for the sub-modules achieved in the corresponding sub-module exams.

(3) If the overall grade is at least “adequate”, the failed sub-module exam of a sub-module does not need to be resat.

(4) If the overall grade is not at least “adequate”, both sub-module exams of the module must be resat.

(5) Only the overall grade for the module will appear on the certificate. The grades for the two sub-modules are not listed separately.

V. Transitional and concluding provisions

§ 15 Transitional provisions

For all students who have studied at Universität Siegen in the mechatronics master's degree course already in the spring term 2012 or earlier, the exam regulations from August 27th 2004 (Amtliche Mitteilungen 12/2004) will continue to apply in their most recent update version.
These students have to complete their studies by the end of the fall term (Wintersemester) 2014/2015. After that, they are no longer entitled to take exams, and lectures are no longer held for them.

§ 16 Entry into force and publication

These exam regulations shall enter into force with effect from 1 October 2012. They are published in the official gazette “Official notices of the University of Siegen” (*Amtliche Mitteilungen der Universität Siegen*).

Issued due to the resolution of the faculty council of the Faculty of Science and Technology dated 5 June 2013.

Siegen, [date] The Rector

Appendix 1: Modules and credits of the mechatronics master's degree course

Module blocks and modules

	Semester	ME CPs	EE CPs
Customisation module block **Total**		**15**	**15**
Embedded Control	1	5	
Electrical and Electronic Engineering I	1	5	
Materials Science	1		5
Machine Elements	1		5
Electrical Machines and Power Electronics	2	5	
Engineering Design I + II	2		5
optional instead of one of the above modules scientific project work as per section 10	1	5	5
Integration module block **Total**		**30**	**30**
Automation & Industrial Communication	1	5	5
Fluid Power	1	5	5
Sensorics	2	5	5
Project Management		5	5
Part 1: Methods and Instruments	1		
Part 2: International Engineering and Construction Projects	2		
Introduction to Programming	2	5	5
Fundamentals of Control		5	5
Part 1: Linear Control	1		
Part 2: State Space Control	1		
Advanced module block **Total**		**35**	**35**
Advanced Control	2	5	5
Machine Dynamics & Systems Dynamics	2	5	5
Fundamentals for Mechatronic Applications		5	5
Part 1: Electrical and Electronic Engineering II	2		
Part 2: Mechatronic Design for Production Machines	2		
S/W Engineering	3	5	5
Mechatronic Systems	3	5	5
Actorics	3	5	5
Modelling and Simulation	3	5	5
Application module block **Total**		**10**	**10**
Languages and non-technical applications		5	5
Part 1: Languages	4		
Part 2: Non-technical applications	4		
Technical applications	4	5	5

Study credits in the 1st and 2nd semesters

Module	ME Hrs per wk per S	ME CPs	EE Hrs per wk per S	EE CPs	Module block	Type of study credit
1st semester (winter semester)						
Embedded Control	4	5			CM	WrEx2
Electrical and Electronic Engineering I	4	5			CM	WrEx2
Materials Science			4	5	CM	WrEx2
Machine Elements			4	5	CM	WrEx2
Automation & Industrial Communication	4	5	4	5	IM	WrEx2
Fluid Power	4	5	4	5	IM	WrEx2
Fundamentals of Control **)		5		5	IM	
Part 1: Linear Control	2		2			WrEx1
Part 2: State Space Control	2		2			K1
Project Management ***) *(Part 1: 1st semester 1, part 2: 2nd semester)*						
Part 1: Methods and Instruments	2	2	2	2	IM	WrEx1
optional instead of a module from the customisation module block: scientific project work as per section 10		5		5	CM	Bachelor-level thesis
	22	27	22	27		
2nd semester (summer semester)						
Electrical Machines and Power Electronics	4	5			CM	WrEx2
Fundamentals for Mechatronic Applications **)		5		5		
Part 1: Electrical and Electronic Eng. II	2		2		AdvM	WrEx1
Part 2: Mechatronic Design for Production Machines	2		2		AdvM	P
Engineering Design I + II			4	5	CM	WrEx2
Introduction to Programming	4	5	4	5	IM	P
Advanced Control	2	5		5	AdvM	WrEx1 and P
Machine Dynamics & Systems Dynamics	4	5	4	5	AdvM	WrEx2
Sensorics	4	5	4	5	IM	WrEx2
Project Management ***) *(Part 1: 1st semester 1, part 2: 2nd semester)*						
Part 2: International Engineering and Construction Projects	2	3	2	3	IM	WrEx1
	26	33	26	33		

Study credits in the 3rd and 4th semesters

Subject	ME Hrs per wk per S	ME CPs	EE Hrs per wk per S	EE CPs	Module block	Type of study credit
3rd semester (winter semester)						
Actorics	4	5	4	5	AdvM	WrEx2
Modelling and Simulation	4	5	4	5	AdvM	WrEx2
S/W Engineering	4	5	4	5	AdvM	P
Mechatronic Systems	4	5	4	5	AdvM	WrEx2
Studienarbeit (student research project)		10		10		Bachelor-level thesis
	16	30	16	30		
4th semester (summer semester)						
Languages and non-technical applications **)		5		5		
Part 1: Languages	2		2		AppM	*)
Part 2: Non-technical applications	2		2		AppM	*)
Technical applications	4	5	4	5	AppM	*)
Master Thesis		20		20		Master Thesis
	8	30	8	30		

Key:

*) A module catalogue on languages and technical and non-technical application modules will be announced by the board of examiners at the start of the semester. The type of study credit will also be set in accordance with the Uniform Rules.

**) This module consists of two sub-modules. Because of the specific content and learning outcomes of the two parts, two sub-module exams which have been adapted accordingly will be set.

***) The two sub-modules in this module will run in two successive semesters. The final exam will take place after the second semester.

CM: "customisation" module block;
IM: "integration" module block;
AdvM: "advanced" module block;
AppM: "application" module block

WrExx: written exam, where x is the duration of the written exam in hours;
O: oral examination,
P: graded "Studienpraktikum" (practical course) in accordance with the Uniform Rules

ME,EE: Students are classified as mechanical engineers (ME) or electrical engineers (EE) based on their first degree. Certain subjects in the customisation module, the compilation of which is tailored to the different prior knowledge of the students when starting the degree, are only to be taken by the ME group or only by the EE group.

Hrs per wk per S: hours per week per semester
CPs: credit points in accordance with the ECTS (European Credit Transfer System)