



**Department for Electrical Engineering and Information Technology**



**Course specific Study and Examination Regulations**

**for the Master program**

**Medical Systems Engineering**

from April 15, 2021

**!!!This document is only for information.**

**The German version is legally binding!!!**

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# I. General part

## §1

### Area of application

(1) The present course specific study and examination regulations for the master's program Medical Systems Engineering supplement or concretize the binding contents of the general study and examination regulations (ASPO) for the master's programs of the faculties involved in the engineering campus of Otto-von-Guericke University Magdeburg.

(2) The international study program is taught in English, interdisciplinary and is offered by the Faculty of Electrical Engineering and Information Technology in cooperation with the Faculty of Computer Science, the Faculty of Mechanical Engineering, the Faculty of Mathematics, the Medical Faculty, the Faculty of Natural Sciences and the Faculty of Process and Systems Engineering.

## §2

### Course specific educational objectives

(1) Course specific purposes are:

Professional competences: The graduates

- have in-depth expertise in the field of modern medical technology, especially technologies for diagnostics and therapy.
- have a basic understanding of medicine and are able to translate medical issues and technological requirements.
- are able to design and implement technical systems based on medical requirements.
- have an understanding of the burdens and side effects of the technologies on the human organism.
- are able to independently solve scientific tasks by means of suitable methods and to present the results of their work both in scientific and in popular science form in different media (journals, presentation, internet).
- are prepared on the basis of their competences for a flexible employment in different professional fields of medical engineering.
- have an overview of the current scientific topics of medical engineering and are prepared for a further scientific career (PhD).

Social competences: The graduates

- are able to communicate with experts about the contents and problems of medical engineering also in foreign languages.
- are familiar with good scientific practice.
- are able to work individually and as a member of international groups.
- are prepared for academic work by having a sufficient practical relevance to professional life, especially in industry, as well as by their scientific competence.
- can grasp complex planning contexts in a structured manner and realize their implementation professionally with methods of project management considering business aspects.

Occupational fields: The completion of this master qualifies especially for the occupational fields:

- Development engineer in the medical engineering industry
- Computer scientist in the hospital, in the health care service, in the medical industry
- Developer of intelligent human-machine interfaces
- Scientists in industrial, academic and clinical research in medical engineering, computer science and neuroscience
- Consultant for medical systems and equipment
- Product management and sales of medical products
- Self-employment in the field of medical engineering and medical informatics

## II. Scope and process of the study

### §4

#### Admission to study / Admission requirements

- (1) A completed degree must have at least the following CP distribution:
- at least 20 CP (according to ECTS) in the field of mathematics
  - at least 20 CP (according to ECTS) in the field of electrical engineering and information technology / electronics
  - at least 15 CP (according to ECTS) in the field of physics / medical physics
  - at least 10 CP (according to ECTS) in the field of computer science / programming
  - at least 5 CP (according to ECTS) in the field of anatomy / physiology
- (2) The particular suitability is determined on the basis of the result of the final examination in accordance with §4 section 1 of the ASPO-M and requires that the previous studies have been completed with at least a grade point average of 2.5.
- (3) If students have not yet completed their degree at the time of application, the average grade calculated from the examination results must be at least 2.5 in addition to the required CP amount shown above.
- (4) Applicants must prove sufficient knowledge of the English language (level B2 of the Common European Framework of Reference for Languages (CEFR)). One of the following certificates is accepted as proof:
- TOEFL iBT (Test of English as a Foreign Language) at least 90 points
  - IELTS (International English Language Testing System), number of points at least 6.5
  - Certificate of general qualification for university entrance with at least 4 in the continued foreign language English (upper secondary level)

Excluded from this regulation are in principle holders of a school education degree after at least 4 ascending school years from Antigua & Barbuda, Australia, Bahamas, Barbados, Belize, Grenada, Great Britain (incl. overseas territories), Guyana, Ireland, Jamaica, Canada, New Zealand, St. Kitts & Nevis, St. Vincent, Grenadines, Suriname, Trinidad and Tobago as well as USA (incl. overseas territories). Master's degree applicants who have completed their entire bachelor's degree in one of these countries are also excluded.

- (5) Admission may be subject to conditions if more than 30 CP of the CP listed under §4 section 1 are missing. The conditions imposed by the examination board must be fulfilled within two semesters, otherwise the student will be de-registered at the end of the second semester. Until the fulfillment of the requirements, the enrollment is made conditionally.

### §5

#### Start of study and duration of study

- (1) Enrollment takes place in the summer semester. Enrollment in a higher semester is also possible in the winter semester. Enrollment in the summer semester is recommended. The courses offered are designed accordingly.
- (2) The standard period of study, including the masters thesis, is 4 semesters.

### §6

#### Structure and scope of study

- (1) A total amount of 120 CP must be completed in order to successfully complete the program (see appendix General Curriculum).

## §7

### Organization of study

(1) The elective modules are subdivided into different disciplinary deepenings. The structure of the program can be taken from the *General Curriculum* (see appendix) and can be changed according to the development of the subjects and the availability of teaching staff and adapted to the range of courses offered by the department.

The regulations for the choice of deepenings as well as the list of deepenings with the elective modules can be found in the *Catalog of Elective Modules*.

(2) The time points listed in the appendix for taking modules and module examinations are to be understood as recommendations for completing the program in the standard period of study.

## III. Examinations

### §11

#### Examination board

(1) The examination board consists of seven members. The chairing member must belong to the group of professors of the enrolling faculty. Two further members from the group of professors, junior professors or university lecturers must be members of other faculties involved in the study program apart from the enrolling faculty.

Further details about the examination board are regulated by the internal rules of procedure.

## IV. Master degree

### §22

#### Admission to the master thesis and release of the topic

(1) Only students who are enrolled in a degree program of the engineering campus at OvGU Magdeburg and have achieved at least 80 CP from the compulsory and elective courses and have also successfully completed all compulsory modules will be admitted for the master's thesis.

(2) The topic and task description are issued by an university lecturer. This person must be a member of one of the following faculties:

- Faculty of Electrical Engineering and Information Technology (FEIT)
- Faculty of Computer Science (FIN)
- Faculty of Mechanical Engineering (FMB)
- Faculty of Mathematics (FMA)
- Faculty of Natural Sciences (FNW)
- Faculty of Process and Systems Engineering (FVST)

In justified exceptional cases, the topic may be issued by an university lecturer who does not fulfill this condition, upon application of the student to the responsible examination board and with the latter's approval. In this case, the second person authorized to conduct the examination according to § 12, section 1, must be a member of the enrolling faculty.

## V. Final provisions

### § 35

#### Coming into effect

(1) These course specific study and examination regulations for the master's program in Medical Systems Engineering come into effect after their publication in the official announcements of Otto von Guericke University.

Issued on the basis of the resolutions of the Faculty Council of the Faculty of Electrical Engineering and Information Technology of 07.04.2021 and of the supplementary decision of 16.04.2021 and the Senate of Otto von Guericke University of 21.04.2021.

(2) These study and examination regulations apply to all students enrolled in the Medical Systems Engineering degree program as of the winter semester 2021/22.

(3) Students who will be enrolled in the summer semester 2021 may join these study and examination regulations upon written application to the examination board.

Magdeburg, 23.04.2021

Prof. Dr.-Ing. Jens Strackeljan  
Rektor of Otto-von-Guericke-Universität Magdeburg

Appendix 1: General curriculum for the master's program  
Appendix 2: Examination schedule for the master's program

## Appendix 1: General curriculum for the master 's program

Medical Systems Engineering

### Explanation to the general curriculum:

**S** = Semester hours (SWS)

**A** = Types of courses

**V** = Lecture

**S** = Seminar

**Ü** = Tutorial

**K** = Colloquium

**LP** = Lab Project

**PRO** = Research Project

**E** = Field trip

\* = Depends on the chosen modules or not applicable

**CP** = Credit Points

## General scheme

General scheme of the curriculum. The distribution of credit points within one semester depends on the chosen modules. The total workload is constant.

	1. Semester			2. Semester			3. Semester			4. Semester			Total		
	CP	S	A	CP	S	A	CP	S	A	CP	S	A	CP	S	A
Technical compulsory modules	24			16									40		
Methodical and social compulsory modules	5			5									10		
Elective modules - Deepening 1				5			10						15		
Elective modules - Deepening 2				5			10						15		
Elective modules from the total offer							10						10		
Master Thesis										30			30		
	<b>29 CP</b>			<b>31 CP</b>			<b>30 CP</b>			<b>30 CP</b>			<b>120 CP</b>		

Further information about the compulsory modules can be found in the following charts. Further information about the elective modules in the *Catalog of Elective Modules*. For detailed information of all modules, see the document *Module descriptions*.



## Technical compulsory modules

Enrolment: All modules

	1. Semester			2. Semester			3. Semester			4. Semester			Total		
	CP	S	A	CP	S	A	CP	S	A	CP	S	A	CP	S	A
Anatomy for Engineering Students	4	3	S										4	3	S
Introduction to Probability and Statistics	5	4	V/Ü										5	4	V/Ü
Basics of Medical Image Science	5	3	V/Ü										5	3	V/Ü
Introduction to Programming Techniques and Engineering	5	4	V/S										5	4	V/S
Medical Measurement Technology	5	4	V										5	4	V
Clinical Aspects in Imaging and Radiation Therapy				5	2	V							5	2	V
Mathematical Foundations				6	4	V/Ü							6	4	V/Ü
Digital Information Processing				5	3	V/Ü							5	3	V/Ü
	<b>24 CP</b>			<b>16 CP</b>									<b>40 CP</b>		

## Methodical and social compulsory modules

Enrolment: All modules

	1. Semester			2. Semester			3. Semester			4. Semester			Total		
	CP	S	A	CP	S	A	CP	S	A	CP	S	A	CP	S	A
Scientific Working	5	4	S										5	4	S
Solution Design in Medical Engineering				5	3	S							5	3	S
	<b>5 CP</b>			<b>5 CP</b>									<b>10 CP</b>		

## Master Thesis

	1. Semester			2. Semester			3. Semester			4. Semester			Total		
	CP	S	A	CP	S	A	CP	S	A	CP	S	A	CP	S	A
Master Thesis										30			30		
										30 CP			30 CP		

## Appendix 2: Examination schedule for the master 's program

Medical Systems Engineering

### Explanation to the examination schedule:

**LN** = Required course certificates (prerequisites)

\* = Depends on the chosen modules

**PL** = Types of course-related examination achievements

**K** = written examination

**M** = oral examination

**SA** = seminar paper

**HA** = thesis

**EA** = experimental work

**PRO** = research project

**R** = oral presentation

\* = Depends on the chosen modules

**CP** = Credit Points

### Timing of the course assessment:

During the examination period of the semester in which the course attended.

### General scheme

	<b>LN</b>	<b>PL</b>	<b>CP</b>
Technical compulsory modules	-----	-----	40
Methodical and social compulsory modules	-----	-----	10
Elective modules - Deepening 1	-----	-----	15
Elective modules - Deepening 2	-----	-----	15
Elective modules from the total offer	-----	-----	10
Master Thesis	-----	-----	30

## Technical compulsory modules

	LN	PL	CP
Anatomy for Engineering Students	-----	SA	4
Introduction to Probability and Statistics	-----	K60	5
Basics of Medical Image Science	-----	K90	5
Introduction to Programming Techniques in Engineering	-----	K90	5
Medical Measurement Technology	-----	K90	5
Clinical Aspects in Imaging and Radiation Therapy	-----	K90	5
Mathematical Foundations	-----	K90	6
Digital Information Processing	-----	K120	5

## Methodical and social compulsory modules

	LN	PL	CP
Scientific Working	-----	R	5
Solution Design in Medical Engineering	Seminar certificate	R	5

## Master Thesis

	LN	PL	CP
Master Thesis	-----	R	30