

Introduction to the Master's Program Electrical Systems Engineering

Bärbel Mertsching, Head of the Examination Board

Today: Talk given by **Jan Tünnermann**

October 13, 2016

Outline

- Elements of the Master's Program
 - Lectures & Exercises
 - Seminar
 - Project Group
 - Master's Thesis
 - General Studies
- Structure of the Master's Program
 - Specializations
 - Modules
- Examinations
- Good to Know

	MS ESE <small>Prof. Dr.-Ing. Bärbel Mertching University of Paderborn</small>
	Elements of the Master's Program
	<p>Lecture & Exercises (<i>Vorlesung mit Übung</i>)</p> <ul style="list-style-type: none"> ▪ 2 hours lectures and 2 hours exercises per week (V2+Ü2) ▪ Lectures <ul style="list-style-type: none"> ▪ All students meet. ▪ Teacher talks. ▪ Exercises <ul style="list-style-type: none"> ▪ Students meet in subgroups. ▪ Tutor moderates discussion with students. ▪ Students present prepared homework.
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	Elements of the Master's Program
	<p>Seminar (<i>Seminar</i>)</p> <ul style="list-style-type: none"> ▪ 2 meeting hours per week (S2) ▪ Teacher proposes topics. ▪ Every student <ul style="list-style-type: none"> ▪ selects one topic to work on, ▪ prepares a talk with slides (<i>Seminarvortrag</i>) and ▪ submits a written elaboration (<i>Ausarbeitung</i>).
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<div style="float: right; text-align: right;"> MS ESE <small>Prof. Dr.-Ing. Bärbel Mertching University of Paderborn</small> </div> <h2 style="margin: 0;">Elements of the Master's Program</h2>
<h3 style="margin: 0;">Project Group (<i>Projektgruppe</i>)</h3> <ul style="list-style-type: none"> ▪ Two PG for half a year or one PG for an entire year. ▪ Total workload: 1.5 days per week for one year (PG 6) ▪ Students <ul style="list-style-type: none"> ▪ apply for a PG and ▪ work on a project as a team. (in general: analysis, design, realization and test of a system) ▪ PG are highly self-organized.
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<h3 style="margin: 0;">Master's Thesis (<i>Masterarbeit</i>)</h3> <ul style="list-style-type: none"> ▪ Workload: Full-time for half a year ▪ What has to be done? <ul style="list-style-type: none"> ▪ Literature review ▪ Research ▪ Often: Implementation of some software or hardware ▪ Writing a thesis (~ 80-120 pages) on scientific level ▪ All this: Within 6 months (formally checked!) ▪ Two steps: <ul style="list-style-type: none"> ▪ First: Planning phase (typically 1 month) ▪ Second: Execution phase (5 months)
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<div style="float: right; text-align: right;"> MS ESE <small>Prof. Dr.-Ing. Bärbel Mertsching University of Paderborn</small> </div> <h2 style="margin: 0;">Elements of the Master's Program</h2>
<h3>General Studies (<i>Studium Generale</i>)</h3> <ul style="list-style-type: none"> ▪ German language course (Deutschkurs) <ul style="list-style-type: none"> ▪ Hosted by the International Office (<i>Akademisches Auslandsamt</i>) ▪ Strongly advised (a big asset for your future career!) ▪ May cover the „General Studies“ module. ▪ Best students get (partially) reimbursed by the Department of El. Engineering & Inf. Technology ▪ Information: https://www.uni-paderborn.de/en/studium/international-office/deutschkurse/English
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<div style="float: right; text-align: right;"> MS ESE <small>Prof. Dr.-Ing. Bärbel Mertsching University of Paderborn</small> </div> <h2 style="margin: 0;">Structure of the Master's Program</h2>
<h3>Two Specializations</h3> <ul style="list-style-type: none"> ▪ Signal & Information Processing (S&IP) ▪ Electronics & Devices (E&D) <p>Every student selects one of the two.</p> <p>Practical note: If not pre-selected in you PAUL account, select your specialization as the first thing you do in PAUL do avoid future problems when selecting courses.</p>
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Structure of the Master's Program

S&IP

MS Electrical Systems Engineering Specialization: Signal & Information Processing			
1. Semester 20 SWS, 30 CP	2. Semester 20 SWS, 30 CP	3. Semester 20 SWS, 30 CP	4. Semester 30 CP
Introduction to ESE <i>Compulsory subject</i> Advanced System Theory (4 SWS, 6 CP)	Intro. to Signal & Info. Processing <i>Compulsory subject S&IP</i> Statistical Learning & Pattern Recognition (4 SWS, 6 CP)	Signal & Information Processing <i>Compulsory elective</i> (4 SWS, 6 CP)	Master Thesis (30 CP)
Introduction to ESE <i>Compulsory subject</i> Modeling & Simulation (4 SWS, 6 CP)	Signal & Information Processing <i>Compulsory elective</i> (4 SWS, 6 CP)	Electrical Systems Engineering <i>Elective</i> (4 SWS, 6 CP)	
Intro. to Signal & Info. Processing <i>Compulsory subject S&IP</i> Statistical Signals (4 SWS, 6 CP)	Fundamentals of ESE <i>Compulsory elective</i> (4 SWS, 6 CP)	Electrical Systems Engineering <i>Elective</i> (4 SWS, 6 CP)	
Fundamentals of ESE <i>Compulsory elective</i> (4 SWS, 6 CP)			
Management and Application <i>Compulsory subject</i> Management of Technical Projects (2 SWS, 3 CP)	Projects <i>Elective</i> Analysis/ Design (6 SWS, 9 CP)	Projects <i>Elective</i> Realization/ Test (6 SWS, 9 CP)	
General Studies <i>Elective</i> Language Course German or Other (2 SWS, 3 CP)	General Studies <i>Elective</i> Language Course German or Other (2 SWS, 3 CP)	Management and Application <i>Compulsory seminar</i> Topics in Systems Engineering (2 SWS, 3 CP)	
Abbreviations: SWS: Hours per week CP: ECTS credits			

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Structure of the Master's Program

E&D

MS Electrical Systems Engineering Specialization: Electronics & Devices			
1. Semester 20 SWS, 30 CP	2. Semester 20 SWS, 30 CP	3. Semester 20 SWS, 30 CP	4. Semester 30 CP
Introduction to ESE <i>Compulsory subject</i> Advanced System Theory (4 SWS, 6 CP)	Intro. to Electronics & Devices <i>Compulsory subject E&D</i> Fields & Waves (4 SWS, 6 CP)	Electronics & Devices <i>Compulsory elective</i> (4 SWS, 6 CP)	Master Thesis (30 CP)
Introduction to ESE <i>Compulsory subject</i> Modeling & Simulation (4 SWS, 6 CP)	Electronics & Devices <i>Compulsory elective</i> (4 SWS, 6 CP)	Electrical Systems Engineering <i>Elective</i> (4 SWS, 6 CP)	
Intro. to Electronics & Devices <i>Compulsory subject E&D</i> Circuit & System Design (4 SWS, 6 CP)	Fundamentals of ESE <i>Compulsory elective</i> (4 SWS, 6 CP)	Electrical Systems Engineering <i>Elective</i> (4 SWS, 6 CP)	
Fundamentals of ESE <i>Compulsory elective</i> (4 SWS, 6 CP)			
Management and Application <i>Compulsory subject</i> Management of Technical Projects (2 SWS, 3 CP)	Projects <i>Elective</i> Analysis/ Design (6 SWS, 9 CP)	Projects <i>Elective</i> Realization/ Test (6 SWS, 9 CP)	
General Studies <i>Elective</i> Language Course German or Other (2 SWS, 3 CP)	General Studies <i>Elective</i> Language Course German or other (2 SWS, 3 CP)	Management and Application <i>Compulsory seminar</i> Topics in Systems Engineering (2 SWS, 3 CP)	
Abbreviations: SWS: Hours per week CP: ECTS credits			

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<div style="float: right; text-align: right;"> MS ESE <small>Prof. Dr.-Ing. Bärbel Mertching University of Paderborn</small> </div> <div style="clear: both;"></div> <h2 style="margin: 0;">Structure of the Master's Program</h2>
<h3>Compulsory Modules (<i>Pflichtmodule</i>)</h3> <ul style="list-style-type: none"> ▪ Introduction to Electrical Systems Engineering (12 CP) <ul style="list-style-type: none"> ▪ Advanced System Theory ▪ Modeling & Simulation ▪ Management and Application (6 CP) <ul style="list-style-type: none"> ▪ Management of Technical Projects ▪ Seminar Topics in Systems Engineering
<div style="display: flex; justify-content: space-between;"> October 13, 2016 Introduction to the Master's Program Electrical Systems Engineering 10 </div>

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<h3>Compulsory Optional Modules (<i>Wahlpflichtmodule</i>)</h3> <ul style="list-style-type: none"> ▪ Introduction to S&IP <ul style="list-style-type: none"> ▪ Statistical Signal Processing ▪ Statistical Learning & Pattern Recognition <p style="text-align: right; margin-right: 20px;">or</p> <ul style="list-style-type: none"> ▪ Introduction to E&D <ul style="list-style-type: none"> ▪ Fields & Waves ▪ Circuit & System Design <p style="margin-top: 10px;">(according to the specialization chosen) (12 CP)</p>
<div style="display: flex; justify-content: space-between;"> October 13, 2016 Introduction to the Master's Program Electrical Systems Engineering 11 </div>

Structure of the Master's Program

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Elective Modules (*Wahlmodule*)

- **Fundamentals of Electrical Systems Engineering (12 CP)**
 - Advanced Control
 - Introduction to Algorithms
 - Digital Speech Signal Processing
 - High-Frequency Engineering
 - Mechatronics & Electrical Drives
 - Software Engineering

(two subjects from a catalogue of further basic subjects)
- **S&IP or E&D (12 CP)**
 (two subjects from a catalogue for the chosen specialization)

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Example: S&IP

Studying this module means: taking at least **two** of these courses!

The following courses are offered at the moment:

- Advanced Control Methods for Mechatronics
- Advanced Topics in Robotics
- Algorithms and Tools for Test and Diagnosis of Systems on a Chip
- Cognitive Systems Engineering A – C
- Digital Image Processing I
- Digital Image Processing II
- Dynamic Programming and Stochastic Control
- Numerical Simulations with the Discontinuous Galerkin Time Domain Method
- Optical Waveguide Theory
- Optimal and Adaptive Filters
- Robotics
- Topics in Pattern Recognition and Machine Learning
- Topics in Signal Processing
- Wireless Communications


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Example: E&D

Studying this module means: taking at least **two** of these courses!



The following courses are offered at the moment:

- Analog CMOS IC's
- Controlled AC Drives
- Energy Transitions
- Fast Integrated Circuits for Wireline Communications
- High-Frequency Electronics
- Integrated Circuits for Wireless Communications
- Micro-Electromechanical Systems
- Numerical Simulations with the Discontinuous Galerkin Time Domain Method
- Optical Communication A / B / C / D
- Optical Waveguide Theory
- Power Electronic Devices
- Power Electronics
- Processing of Semiconductors
- Radio Frequency Power Amplifiers
- Solar Electric Energy Systems
- Switched Mode Power Supplies
- System Technology for Renewable Energy and Battery Systems
- VLSI Testing

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Further Elective Modules (*Module*)

- **Electrical Systems Engineering** (12 CP)
 (two subjects from all the classes offered in the field of Electrical Systems Engineering, provided that they are not credited to other modules)
- **General Studies** (6 CP)
 (German language course)
- **Projects**
 (18 CP: one full-year or two half-year projects)
- **Master's thesis** (30 CP)

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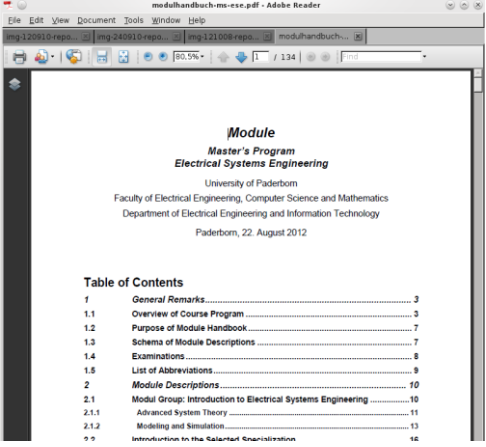
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Module Manual (*Modulhandbuch*)

Available [online as PDF](#).

On the MS ESE Homepage navigate to:

- Examinations
- Documents
- Module handbook



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Examinations

- **Modules**
 - In general: One oral examinations
 - In some cases: Written examinations
- **Project Group**
 - Permanent evaluation throughout the project
- **Master's Thesis**

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Examinations

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Repetitions

- Oral and written examinations can be repeated **twice**.
- The Master's Thesis can be repeated **once**.
- Project group can be repeated twice.
(You will not want to do that!)
- German language course can be repeated infinitely.

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Examinations

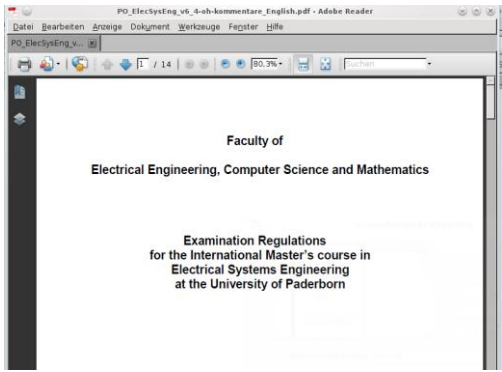
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Examination Regulations (*Prüfungsordnung*)

Available [online as PDF](#).

On the MS ESE Homepage navigate to:

- Examinations
- Documents
- Examination regulations



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	MS ESE <small>Prof. Dr.-Ing. Bärbel Mertsching University of Paderborn</small>
	Examination Board
	<p>What are its tasks?</p> <ul style="list-style-type: none"> ▪ Organizing and supervising examinations: ▪ ensuring compliance with the examination regulations and observance of the rules of procedure adopted for conducting examinations; ▪ decisions on objections to decisions taken in examination procedures; ▪ drawing up an annual report to the Faculty Council on the progress of the examinations and the duration of study; ▪ additional tasks expressly assigned to the Examination Board under these Regulations. <p style="text-align: right; font-size: small;">[Examinations Regulations Sect. 1 (1)]</p>
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	Examination Board <small>contd.</small>
	<p>What are its tasks? <small>contd.</small></p> <p>In addition, the Examination Board makes suggestions about the reform of the examination regulations and the study regulations and discloses the distribution of marks.</p> <p style="text-align: right; font-size: small;">Examinations Regulations Sect. 1 (1)</p>
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Examination Board <small>contd.</small>		MS ESE <small>Prof. Dr.-Ing. Bärbel Mertsching University of Paderborn</small>
Who are its members?		
	Members	Substitutes
Professors	Bärbel Mertsching (chair) Peter Schreier (vice chair) Reinhold Häb-Umbach Sybille Hellebrand	Joachim Böcker Christoph Scheytt
Scientific assistants	Jan Tünnermann	Markus Hennig
Students	Azharuddin Kazi Nirajan Saptoka	Farjad Adnan Lijo Lukose
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How to file a request?		
Use the contact form and add your current transcript of records		
[https://ei.upb.de/fileadmin/elektrotechnik/Formalitaeten/Ordnungen/Electrical_Systems_Engineering/Examination/contact_form.pdf] (underscores, no blanks)		
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Please fill out the following form. You can save data typed into this form. Highlight Fields

Contact Form

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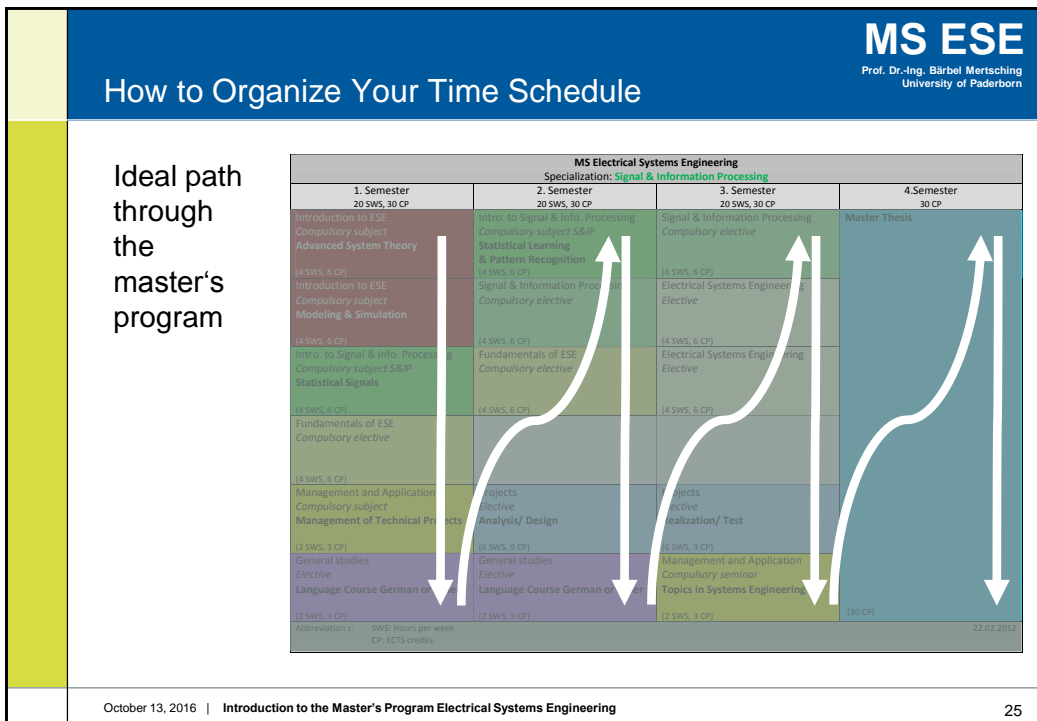
UNIVERSITY OF PADERBORN Paderborn,

PERSONAL INFORMATION		
Last name: <input type="text"/>	First name: <input type="text"/>	Gender : <input type="radio"/> female <input type="radio"/> male
Tel.: <input type="text"/>	Email: <input type="text"/>	

COURSE OF STUDY TO DATE		
Currently enrolled in : Electrical Systems Engineering	in	semester (number)
Begin of studies: <input type="radio"/> winter semester <input type="radio"/> summer semester	Year: <input type="text"/>	
Registration no. at the University of Paderborn: <input type="text"/>		
Specialization: <input type="radio"/> Signal & Information Processing <input type="radio"/> Electronics & Devices		
<input type="radio"/> INQUIRY <input type="radio"/> APPLICATION		
Subject: <input type="text"/>		

DETAILED DESCRIPTION		
<input type="text"/>		

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Studying at Different Speeds

Bridging Gaps

L.048.92999
C++ Programming
Philipp Schubert

MS Electrical Systems Engineering			
Specialization: Signal & Information Processing			
1. Semester 20 SWS, 30 CP	2. Semester 20 SWS, 30 CP	3. Semester 20 SWS, 30 CP	4. Semester 30 CP
Introduction to ESE <i>Compulsory subject</i> Advanced System Theory (4 SWS, 6 CP)	Intro. to Signal & Info. Processing <i>Compulsory subject S&IP</i> Statistical Learning & Pattern Recognition (4 SWS, 6 CP)	Signal & Information Processing <i>Compulsory elective</i>	Master Thesis
Introduction to ESE <i>Compulsory subject</i> Simulation (4 SWS, 6 CP)	Signal & Information Processing <i>Compulsory elective</i>	Electrical Systems Engineering <i>Elective</i>	
Intro. to Signal & Info. Processing <i>Compulsory subject S&IP</i> Statistical Signals (4 SWS, 6 CP)	Fundamentals of ESE <i>Compulsory elective</i>	Electrical Systems Engineering <i>Elective</i>	
Introduction to Algorithms	No Background in Programming ????		
Management and Application <i>Compulsory subject</i> Management of Technical Projects (2 SWS, 3 CP)	<i>Elective</i> Analysis/ Design	Projects <i>Elective</i> Realization/ Test	
General studies <i>Elective</i> Language Course German or other (2 SWS, 3 CP)	General studies <i>Elective</i> Language Course German or other (2 SWS, 3 CP)	Management and Application <i>Compulsory seminar</i> Topics in Systems Engineering (2 SWS, 3 CP)	
Abbreviation: SWS: Hours per week CP: ECTS credits			22.02.2012

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Some Important Deadlines

- Enrollment for the current semester: **Already closed.**
- Registration for courses in Paul until **October 28.**
- Registration for examinations in Paul from **October 24** until **November 24.**

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	<p>MS ESE Prof. Dr.-Ing. Bärbel Mertching University of Paderborn</p>
	<p>Any questions?</p>
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